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NUMBER 10

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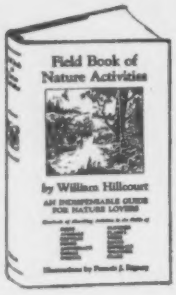

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Reviews

Living Insects of the World

By Alexander B. Klots and Elsie B. Klots. New York. 1959. Doubleday and Company. 305 pages. With 277 photographs, including 152 in full color. $9.95.

This is a beautiful and fascinating book, amazingly informative in its popular treatment of a vast subject. As the authors point out in their preface: "There are more species of insects than of all other animals and plants combined. Some are simple and primitive in both structure and behavior; and many live in a wide variety of habitats and feed on almost anything they encounter. The majority, however, are highly evolved and delicately attuned to very special and restricted ways of life. Some form true societies of a magnitude and complexity unsurpassed by those of any other animals, man himself included. . .The lives of even the most urbanized human beings are far more intimately associated with and affected by the insects than is generally realized." It was therefore a serious task confronting the Doctors Klots to plan and prepare this book. They have certainly succeeded in presenting a remarkably inclusive introduction to the world of insects. They are aided in achieving their goal by splendid illustrations effectively reproduced, many in large size and more than one-half of them in fine color.

Briefly Noted

North American Waterfowl. By Albert M. Day. Harrisburg, Pa. 1959. The Stackpole Company. 363 pages. Illustrated. $5.75. This is a second edition of this book by the former Director of the U. S. Fish and Wildlife Service.

Soon After September. By Glenn O. Blough. New York. 1959. Whittlesey House. 48 pages. Illustrated by Jeanne Bendick. $2.50. A story of living things in winter for the younger reader.

The Spanish Plateau. By Peter Buckley. New York. 1959. Coward-McCann, Inc. 96 pages. Illustrated. $2.50. One on the Challenge Books series by this publisher, this being the challenge of a dry land.

Principles of Mechanics. By John L. Synge and Byron A. Griffith. New York. 1959. McGraw-Hill Book Company. 552 pages. $9.50. A third and revised edition of this text on theoretical mechanics for the intermediate level.

Men, Moss and Reindeer. By Erick Berry. New York. 1959. Coward-McCann, Inc. 96 pages. Illustrated. $2.50. A "Challenge" book dealing with Lapland.

Curious Naturalists. By Niko Tinbergen. New York. 1959. Basic Books, Inc. 280 pages. Illustrated. $5.00. This is the autobiography of a naturalist and an account of the struggle of many creatures for survival.

Grassblade Jungle. By Nesta Pain. New York. 1959. Coward-McCann, Inc. 207 pages. $3.75. Stories of the life cycles of various insects of the grassblades, effectively told.

Outdoor Reference Guide. By Amelia Reynolds Long. Harrisburg, Pa. 1959. The Stackpole Company. 288 pages. Illustrated. $7.50. Encyclopedia of names and terms that should be a part of the vocabulary of lovers of the outdoors.

Animal Camouflage. By Adolph Portmann. Ann Arbor, Michigan. 1959. University of Michigan Press. 111 pages. Illustrated. $4.50. About protective coloration and other protective devices with which Nature has equipped many of her creatures.

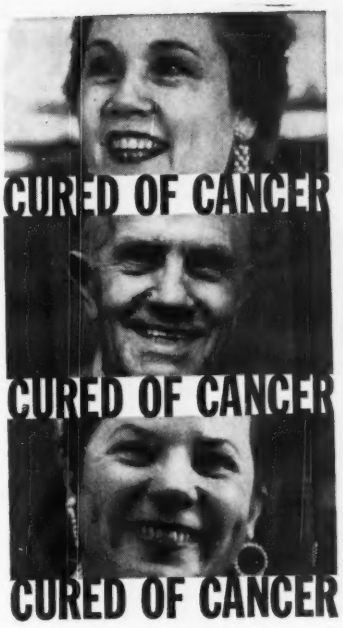
Successful Surf Fishing. By Jerry Jansen. New York. 1959. E. P. Dutton & Co. 224 pages. Illustrated. $3.75. A guide to surf angling and beach camping.

Cell and Tissue Culture. By John Paul. Baltimore, Maryland. 1959. Williams and Wilkins Co. 261 pages. $7.00. Bringing up to date techniques and applications of tissue culture.

Daffodils, Outdoor and In. By Carey E. Quinn. New York. 1959. Hearthside Press. 204 pages. Illustrated. $4.50. Answers to all the questions about raising these flowers under varying conditions.

How to Read a Rabbit. By Jean Fritz. New York. 1959. Coward-McCann, Inc. Illustrated by Leonard Shortall. $2.50. Story for the 5 to 9 age group based on an animal lending library.

Jim Clyman. By Hal G. Evarts. New York. 1959. G. P. Putnam's Sons. 191 pages. $3.00. Biography of one of the greatest of the early explorers of the West. Written for the 12 to 16 age group and one of a series.



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Briefly Noted

101 American Wild Flowers. By Jewell Casey. New York. 1959. Vantage Press. 101 pages. Illustrated. $3.00. Informal description of wildflowers, mainly of the Southwest and Texas.

Strange Partners. By Sigmund Lavine. Boston. 1959. Little, Brown and Co. 106 pages. Illustrated by Gloria Stevens. $2.75. Popular discussion of partnerships in Nature, or commensalism.

Plants that Changed the World. By Bertha S. Dodge. Boston. 1959. Little, Brown and Co. 183 pages. Illustrated by Henry B. Kane. $3.50. Plants that have been of signal service to mankind and have helped make history.

College Physics. By Robert L. Weber, Marsh W. White, and Kenneth V. Manning. New York. 1959. McGraw-Hill Book Company. 640 pages. Illustrated. $7.50. Three members of the faculty at Pennsylvania State University collaborate in this physics text at the college level.

How to Raise and Train a Pekinese. By Alice Scott. New York. 1959. Sterling Publishing Co. 64 pages. Illustrated. Cloth, $2.00; Paper, $10.00. Practical advice on this dog breed.

Find a Career in Conservation. By Jean Smith. New York. 1959. G. P. Putnam's Sons. 160 pages. $2.75. Description of careers in the conservation of parks, forests, wildlife, soil and water and how to prepare for this work.

The Realm of the Nebulae. By Edwin Hubble. New York. 1959. Dover Publications. 207 pages. Illustrated. $1.50. Republication of the Silliman Lectures at Yale in 1935.

Out of the Sky. By H. H. Nininger. New York. 1959. Dover Publications. 336 pages. Illustrated. $1.85. Introduction to meteorites.

On the Face of the Earth. By Marion Gill MacNeil. New York. 1959. Henry Z. Walck. 72 pages. Illustrated by Robert P. MacNeil. $2.75. The story of the earth and its formation. For the younger reader.

Tent under the Spider Tree. By Gene Inyart. New York. 1959. Franklin Watts, Inc. 143 pages. $2.95. Winner of the Second Annual $3500 Fiction Award for Distinguished Contribution to Children's Literature.

Guide to Trails in the Shenandoah National Park. Washington, D. C. 1959. The Potomac Appalacahian Trail Club. 307 pages. Fifth Edition. Revision of this guide to the Appalachian Trail and side trails in Shenandoah National Park.

The Golden Book of Wild Animal Pets. By Roy Pinney. New York. 1959. Golden Press. 68 pages. Illustrated in color. $1.95. Finding and caring for animals of the woods, field and stream.

Wonders of the Reptile World. By Helen Gere Cruickshank. New York. 1959. Dodd, Mead and Company. 64 pages. Illustrated by Lon Ellis. $2.95. One in the series of "Wonders" books by this publisher. The audience is the 8-to-12 age group.

Jets and Rockets and How They Work. By William P. Gottlieb. New York. 1959. Doubleday and Company. 56 pages. Illustrated in color. Introducing the younger reader to the rudiments of the jet and rocket age.

John Colter. By Mark Boesch. New York. 1959. G. P. Putnam's Sons. 189 pages. $3.00. Another in the series of biographies of the early West, this one dealing with the discoverer of Yellowstone

The Silver Brumby. By Elyne Mitchell. New York. 1959. E. P. Dutton and Co. 192 pages. Illustrated by Ralph Thompson. $2.95. A novel in which a legendary palomino is cast against the background of the Australian bush.

Gathered Leaves. By Ernest Jesse Palmer. New York. 1959. The William-Frederick Press. 126 pages. $3.50. Collected poems by a botanist and poet who proves by this book his eminence in both fields of expression.

The Sun. By Karl Kiepenheuer. Ann Arbor, Michigan. 1959. The University of Michigan Press. 160 pages. Illustrated. $5.00. A renowned solar physicist provides a readable report of what we know about the sun.

This Is the Desert. By Phil Ault. New York. 1959. Dodd, Mead and Company. 175 pages. Illustrated by Leonard Everett Fisher. $2.75. Description of the desert in its many manifestations, man-connected and otherwise, by one who knows the desert well.

101 Wildflowers of Crater Lake National Park. By Grant and Wenonah Sharpe. Seattle, Washington. 1959. University of Washington Press. 40 pages. Illustrated. $1.00. A simple and popular guide to the principal wildflowers of this beautiful park.

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Nature IN PRINT

By HOWARD ZAHNISER

"How Can I Leave Thee?"

NEWS THAT THIS DISCUSSION of "Nature in Print" would be destined for this last issue of *Nature Magazine* at first rather shocked me, as naturally does the threatened end of anything counted good. Reminiscence followed, and there came remembrance of experiences through the years of writing earlier contributions—in camps, trains, airplanes, in libraries, museums, in the Cincinnati Union Terminal—but mostly at home in attic, alcove, or bed, or at the dining room table. Reviews especially exciting for the reviewer, such as the one for Ada Clapham Govan's *Wings at My Window*, came to mind, and then a thought of choosing, from the books of these years of reading, ten to discuss in a final word.

The ten chosen—not necessarily the ten best, not all from "Nature in Print" reviews, simply ten texts for a last word—were the Modern Library's *Walden and Other Writings of Henry David Thoreau* edited by Brooks Atkinson (this edition selected because it includes also the essay on "Walking"), Edward H. Graham's *Natural Principles of Land Use*, Harrison Brown's *The Challenge of Man's Future; An Inquiry Concerning the Condition of Man During the Years That Lie Ahead*, William Vogt's *Road to Survival*, Aldo Leopold's *A Sand County Almanac and Sketches Here and There*, Joseph Wood Krutch's *Grand Canyon: Today and All Its Yesterdays*, Robert Marshall's *Arctic Wilderness*, edited by George Marshall, Lois Crisler's *Arctic Wild*, Sigurd F. Olson's *The Singing Wilderness*, and finally Albert Schweitzer's *Civilization and Ethics*, because I wanted to consider rather centrally Dr. Schweitzer's conclusion:

"True philosophy must start from the most immediate and comprehensive fact of consciousness which says: 'I am life which wills to live, in the midst of life which wills to live.' "

See the New Park Books!

Surely a discussion of these ten books would be profitable. Yet here is the magnificent new volume being published by the National Geographic Society on *America's Wonderlands: The Scenic National Parks and Monuments of the United States*. Arriving at just about the same time was the Smithsonian Institution's publication of Victor H. Cahalane's *A Biological Survey of Katmai National Monument*. A discussion of national parks could include also Harper's recent book on Mt. Rainier—Floyd Schmoe's *A Year in Paradise*—on my shelf awaiting such an opportunity. With it could be reviewed John Hay's *The Run*, a Doubleday August, 1959, volume, in which a Cape Cod naturalist writes about migrating alewives, in a prospective addition to the National Park System. Such an article could be the review also of Herman Silva Forest's book issued last summer by Vantage Press—*Jessie's Children*—about a Knoxville hiking club's jaunts into the Great Smoky Mountains National Park. Kenneth Chasey's *Camping Digest* would fit in here (a guide to campgrounds in the United States, Canada, and Alaska published by the Naylor Company in San Antonio, Texas), and also perhaps Bradford Angier's *How To Go Live in the Woods on $10 a Week*, just received from Stackpole, although it is no national park book. So would Marjory Bartlett Sanger's delightful 8-to-12-year-old's story at an Audubon camp in Massachusetts, published by Dutton with the title *Greenwood Summer*—also the Exposition Press's little volume by Sue Jenkins, *Memories of Ebeeme: The Delights of Nature and Living at a Summer Camp in Maine*.

Yet instead of a discussion of books about national parks there is a strong disposition to discuss Arthur H. Carhart's book, *The National Forests*, published by Alfred A. Knopf, and perhaps with it Henry Williamson's *A Clear Water Stream*, published by Ives Washburn, and Joseph A. Cocannouer's *Water and the Cycle of Life* from Devin-Adair.

That reminds me of Leonard Hall's *Stars Upstream: Life Along An Ozark River*, from the University of Chicago Press, and Lippincott's thousand-page novel of the Mississippi—*Big River, Big Man* by Thomas W. Duncan, which I had thought might comprise a review along with David Stick's *The Outer Banks of North Carolina 1584-1958*, from the University of North Carolina Press, and Wiley's *Anglo-American: A Regional Geography*, by Earl B. Shaw.

Books About Wildlife

This geography book, however, suggests a contemplated essay featuring Harper's October publication of the remarkable book by Henry Hill Collins, Jr., with the long title *Complete Field Guide to American Wildlife—East, Central and North—Covering All Species of Birds, Mammals, Reptiles, Amphibians, Food and Game Fishes, Seashells, and the Principal Marine Invertebrates Occurring Annually in North America East of the Rockies and North of the 37th Parallel*. With it is Doubleday's *Animal Tracks and Hunter Signs*, by Ernest Thompson Seton, as assembled "into a readable book" by Julia M. Seton, and also the magnificent college textbook so fascinating to any bird student, *Fundamentals of Ornithology*, by Josselyn Van Tyne and Andrew J. Berger published by John Wiley & Sons. Two Garden City Books, album-sized thin volumes colorfully illustrated for younger readers (and me), are here too—James Fisher's *The Wonderful World of the Air* and Julian Huxley's *The Wonderful World of Life*—which brings finally into this assembly Richard Carrington's *Elephants: A Short Account of their Natural History, Evolution and Influence on Mankind*, published by Basic Books.

Elephants bring to attention Raymond B. Cowles's *Zulu Journal: Field Notes of a Naturalist in South Africa*, published in October by the University of California Press—a fascinating and significant volume that deals with the human natives as well as the natural history of other life and recalls also last summer's book from David McKay Company about a journey across the South American continent, *With Graciela to the Head-Hunters* by Alfred Boeldeke with Louis Hagen. These accounts of primitive peoples make pertinent here an August publication from Criterion Books—*The NEW Golden Bough: A New Abridgment of the Classic Work*, by Sir James George Frazer, edited with notes and foreword by Dr. Theodor H. Gaster.

L. S. Palmer's scholarly book from the Philosophical Library, *Man's Journey Through Time: A First Step in Physical and Cultural Anthropochronology*, one remembers at this point, was suggested by "recent discoveries of the remains of primitive men in Africa, China, Java and Palestine." This brings to mind Doubleday's informal history of evolution *The Road to Man*, by Herbert Wendt, and suggests that perhaps these two volumes, with Julian Huxley's *The Wonderful World of Life*, comprise a sufficient group to conclude our "Nature in Print" with an essay on evolution.

Let's Discuss Adventure

However, the distant adventure theme also attracts attention and suggests as subjects Eric C. Hiscock's *Around the World in Wanderer III*, from the Oxford University Press, with Little, Brown's *The Crossing of Antarctica: The Commonwealth Trans-Antarctic Expedition 1955-1958* by Sir Vivian Fuchs and Sir Edmund Hilleary. McGraw-Hill's *Endurance: Shackleton's Incredible Voyage*, by Alfred Lansing, would fit here too—and also Little, Brown's *Vastness of the Sea: Adventure in the Mysterious Depths*, by Bernard Gorski (translated from the French by Alec Brown) and that fascinating book issued last June by the Johns Hopkins Press on *The Earth Beneath the Sea*, by Francis P. Shepard.

At this point I remember a collection of volumes for an article that would discuss biography. Five of these books are for younger readers: William Condry's *Thoreau* and Ruth Tomalin's *W. H. Hudson* from the Philosophical Library, Catherine Owens Peare's *A Scientist of Two Worlds: Louis Agassiz* from Lippincott, *Jedediah Smith: Trail Blazer of the West*, by Hal G. Evarts, published by Putnam, and Lillian J. Bragdon's *Luther Burbank: Nature's Helper*, published by the Abingdon Press. Yet here too is *John Burroughs: Naturalist: The Story of His Work and Family by His Granddaughter*, by Elizabeth Burroughs Kelley, and a seventh biography is the significant *George Perkins Marsh: Versatile Vermonter*, by David Lowenthal published a year ago by Columbia University Press.

College texts

Marsh's nineteenth-century volume, *Man and Nature*, which his biographer refers to as "the first sophisticated analysis of man's relation to his environment," reminds me, after all, of the article I have had in preparation for some time to call to general readers' attention the wealth of "Nature in Print" being published in textbooks.

Conservation of Natural Resources, edited by Guy-Harold Smith but written by nineteen authors, is a 1958 second edition of a 1950 volume. Raymond F. Dasmann's *Environmental Conservation*, a February 1959 publication, appeals especially to the serious lay reader.

Taking "the long view of conservation problems by considering the history of human populations in relation to natural resources," it "expresses the opinion that in any planning for the future of man on this earth, we must also plan for the wild land and wild creatures which have been a part of his heritage and which must remain a part of his life—if such life is to have much meaning."

With these volumes—both published by Wiley—there also are here, for this discussion of a layman's interest in new college textbooks, four new volumes published by McGraw-Hill Book Co. One of them—Shirley Walter Allen's *Conserving Natural Resources: Principles and Practice in a Democracy*—is a 1959 revision of a 1955 volume. New works are *Principles of Field Biology & Ecology* by Allen H. Benton and William E. Werner, Jr.; *Natural Resources*, edited by Martin R. Huberty and Warren L. Flock, but written by 23 authors, including Walter P. Taylor, who writes on "Ecology, Wildlife and Wilderness;" and *Recreational Use of Wild Lands*, by C. Frank Brockman. Other such publications of McGraw-Hill to be included in this discussion would be Samuel Trask Dana's *Forest and Range Policy: Its Development in the United States*, Angus M. Woodbury's *Principles of General Ecology*, and E. Laurence Palmer's marvellous *Fieldbook of Natural History*.

A Thoreau Piece

And I am eager also to write of Walter Harding's *A Thoreau Handbook* and *The Correspondence of Henry David Thoreau* edited by Harding and Carl Bode, both from New York University Press.

"Of all sad words. . ."

Alas, however, my last contribution is now all but made. My time is past, there is no more space, and instead of writing something, I have only noted what I might write. In the midst of good intentions, we face—the end.

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Reviews

Adventures in Nature

By Edwin Way Teale. New York. 1959. Dodd, Mead and Company. 304 pages. Chapter headings by Walter W. Ferguson. $4.00.

In this attractive and most readable book Edwin Way Teale anthologizes Edwin Way Teale. Turning back to a half-dozen of his earlier books, some of which are out of print, Mr. Teale chooses thirty-one selections from these works. Each one deals with an adventure in Nature, and Ed Teale has had many of them, in many parts of the country and of fascinating variety. Some of the chapters, indeed, originally appeared in *Nature Magazine* prior to their publication in the original book from which the anthology selection was taken. The author's considerable army of readers will welcome this book, and it will, no doubt, win him additional followers.

The Voyage of the Beagle

By Charles Darwin. Abridged by Millicent E. Selsam. New York. 1959. Harper and Brothers. 327 pages. Illustrated by Anthony Ravielli. $3.95

Preparation of this abridgment of *The Voyage of the Beagle* was inspired by the fact that the past twenty-five years have seen publication of additional material on the voyage written by Darwin but not previously published, and by the fact that no analysis of the trip has ever been published alongside the text, as is here done. Furthermore much of the long text of the original is tedious and not of interest to the general reader. The abridger has most effectively cut the original in half and, in so doing, given the book far greater readability.

A Year in Paradise

By Floyd Schmoe. New York. 1959. Harper and Brothers. 235 pages. Illustrrted. $4.50.

Kansas-born and educated, the author's first romance with Mount Rainier followed closely on his romance and marriage of Ruth in Seattle at the close of World War I. Floyd was enrolled at the University of Washington College of Forestry and Ruth was taking liberal arts courses. They soon discovered that two cannot live as cheaply as one and the economics of the situation led to the author's seeking a job as a guide on the mountain. Followed service as Park Ranger and Park Naturalist, and from his intimate knowledge of this Park is born this warm introduction to the great mountain. None knows it better or loves it more.

W. L. McAtee

DECEMBER'S AUTHORS

Ida Smith

To our December issue Nina Wilcox Putnam, famous novelist and short story writer who presently makes her home in Cuernavaca, Mexico, contributes the touching—and true—story of a Mexican gardener who nearly sacrifices all through his deep love for son, bottle and plants. . .Frank W. Lane, naturalist of Ruislip, Middlesex County, England, is that nation's leading popular interpreter of the lives and often-remarkable habits of the world of animals. . .Robert B. McCoy, many times a contributor to the pages of Nature Magazine, is a Chicago magazine group editor, ardent national park and wilderness area enthusiast, and a free-lance writer and photographer. . .Paul E. Stone, spare-time breeder of lepidoptera and resident of Munith, Michigan, is another outdoors enthusiast who, in addition to his regular hobby, engages in the cultivation and study of native wild flowering plants, Nature photography and bird study. . .W. L. McAtee is a retired biologist of the U. S. Fish and Wildlife Service, a member of the Scientific Consulting Board of Nature Magazine, and a resident of Chapel Hill, North Carolina. . .Ida Smith, free-lance writer and photojournalist of Phoenix, Arizona, belong, with her husband, Moulton, to that remarkable segment of the American public known as rockhounds, with an additional interest in birds, mammals, plants, and, in Mrs. Smith's words, "all of Nature." Especially enjoyable to the author and her husband are occasional camping trips into the isolated parts of the American Southwest. . .Weldon F. Heald, of Tucson, Arizona, is well known in American conservation activities, especially as a strong advocate and worker for wilderness area preservation. Mr. Heald is a free-lance article writer and photographer whose work has appeared in the pages of Nature Magazine many times.

Insect Builders and Craftsmen

By Ross E. Hutchins, Chicago. 1959. Rand McNally and Co. 96 pages. Illustrated. $2.95.

Entomologist of the Mississippi State Plant Board and Professor of Zoology and Entomology at Mississippi State College, Ross Hutchins is also an able writer and excellent photographer. His writing, scientific background and skill with camera combine to make this book fascinating and valuable. As the title suggests, the author is concerned with the insects that build and exercise a special craft in their lives.

This World of Living Things

By Paul Griswold Howes. New York. 1959. Duell, Sloan and Pearce. 232 pages. $4.50.

For forty years Paul Griswold Howes has been Curator of the Bruce Museum in Greenwich, Connecticut. On many occasions during those four decades he has roamed far and wide, with particular attention to the tropics and sub-tropics of this hemisphere. He has been equally concerned with the natural history right at home, as his various books attest. This latest volume explores fascinating areas of Nature knowledge. The final four chapters are devoted to the tropical forests of Dominica, Colombia, British Guiana and Panama, in contrast with two earlier chapters on Nature in the morning and at night in the woodlot. Splendidly written, this book will please anyone interested in Nature.

Codfish, Cats and Civilization

By Gary Webster. New York. 1959. Doubleday and Company. 263 pages. $3.95

In tune with its intriguing and certainly non-descriptive title, Gary Webster has assembled a most interesting book. Because the title is rather cryptic, there is a subtitle: "The amazing story of the part other living creatures have played in man's early history and present civilization." The subjects of his chapters, all charmingly and informatively written, range from the European starling to the mule, include the buffalo and the wolf, the honeybee and the housefly, the grizzly bear and the ape. Chapters stand alone but also achieve an entity through their relationship to man—and civilization.

Katmai

A Biological Survey of Katmai National Monument. By Victor H. Cahalane. Washington, D.C. 1959. Smithsonian Institution. 246 pages. Illustrated and with end-map. This is an important addition to publications on National Park Service areas.

Contents Noted BY THE EDITOR

WITH DUCKS SERIOUSLY REDUCED in numbers due to drought and less breeding area due to drainage, the migratory waterfowl hunters this year have a shorter season and smaller bag, except along the Pacific flyway. While in our opinion a closed season would have been a safer and a wiser decision for 1959, the loss of revenue from duck stamps, licenses, and arms and ammunition tax again, as in the thirties, influenced the decision. The Bureau of Sport Fisheries and Wildlife recognizes the risk and is exerting every effort to soften the impact of the continued open season. One device is a poster urging gunners to hold their fire until, after the example of the Minute Men, the birds' eyes are visible. The Bureau's release states: "The hope is to cut down the appalling crippling losses, to add to the hunter's bag of birds which would otherwise be lost to him, and to save for next year nesting birds which otherwise would die in the marshes. It is estimated that one-fourth of the birds shot are not recovered." This is indeed an "appalling" waste of beautiful birds, and, from the humane point of view, something one does not like to contemplate.

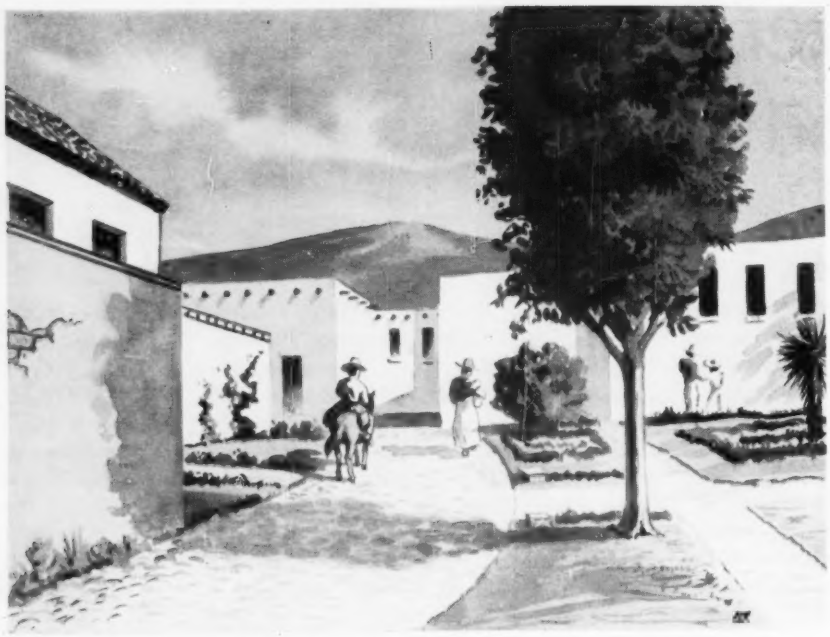
The officers of the American Nature Association join with the trustees of the American Museum of Natural History to announce the consolidation of NATURE MAGAZINE with the magazine NATURAL HISTORY. Commencing with the issue of January, 1960, these two distinguished publications will appear within a single cover. Many outstanding features that have appeared regularly in NATURE MAGAZINE will be continued in the combined publication. Members of the American Nature Association and subscribers to NATURE MAGAZINE will continue to receive the merged magazine for the full term of their subscriptions. **(See page 537 for further details.)**

THE WHITEFLY, A GREENHOUSE PEST, has, at least in the Cleveland area, built up an immunity to such high-powered insecticides as Parathion and Malathion. So the growers of greenhouse vegetables turned to using aerosol bombs laden with Phosdrin. Earlier this year several greenhouse men were made ill and two were hospitalized. Most recently another man went into a coma from Phosdrin poisoning. His doctor said: "He developed terrific muscular contractions that cut off the blood to his brain, causing a thrombosis in the brain stem." In applying the insecticide the poisoned man (who recovered) followed the manufacturer's directions and wore a gas mask and protective clothing. Only his ears were exposed, but that was enough. We cite this case, as we have others, as an indication of the dangers inherent in even careful use of such high-powered poisons. And what may happen to people ingesting foods exposed to such lethal concoctions!!!

A THIRTY-MILLION DOLLAR INCREASE in income from forest timber sales and other land uses is reported by the U. S. Forest Service for the 1959 fiscal year, as compared with 1958. The total was more than $124,000,000, all but about two millions coming from sale of timber. Twenty-five percent of this revenue goes to the States for use for roads and schools by the counties in which national forests are located; the balance goes into the Federal Treasury. The Service hails this as "indication that multiple use management of national forests is good business." It is to be hoped that a somewhat more adequate sum will be forthcoming from Congress to implement the "Program for the National Forests," submitted earlier this year to Congress by the Secretary of Agriculture. It is also to be hoped that too much obeisance to the dollar sign will not result in lessening protection of wilderness areas until such time — and we trust that is soon — as these areas are given firmer status through enactment of wilderness legislation. The Wilderness Bill is still pending in Senate Committee but early consideration by the committee and report are promised.

GLEN HELEN, ANTIOCH COLLEGE'S NATURE preserve was, a few months ago, seriously threatened by a major highway. Through the intercession of Ohio's Governor and as a result of public protest, the highway was relocated. Now comes a home-grown threat to this unique preserve. The Village Council of Yellow Springs, Ohio, seeks to run a sewer trunk line and maintenance right-of-way through the center of this natural area, which serves the community and many other Ohio citizens. We applaud the editorial comment of the *Dayton Daily News* which expresses the hope that the community will "demonstrate that a sensitivity to high, enduring values counts more than considerations of today's dollar in major civic decisions."

R.W.W.



"Across the narrow, cobbled street in front of my house is a small public park. . ."

Lesson From a Tree

By NINA WILCOX PUTNAM

Illustrations by Charles L. Ripper

Across the narrow, cobbled street in front of my house is a small public park, and in it stood an Indian laurel tree which was the admiration of everyone who saw it, and my own particular delight. The park was presided over by Don José Maria Lavendera, a gardener who cherished plants beyond any man I have ever known; and he, too, loved this laurel.

Unlike the northern species, the Indian laurels of Cuernavaca are big trees and this one, a male, had grown to an arrogant seventy feet. The bole arose in a flawless column to well above a man's height and then suddenly swelled and thickened into the form of a huge chalice, from the rim of which five sturdy branches curved outward and upward and were quickly hidden in the dark green depths of its incredibly dense foliage.

Of course the tree was full of birds. Good nesting trees are so rare in Mexico that the laurel attracted the most unlikely assortment of feathered patrons. I saw song sparrows, wrens, cardinals, wild canaries and even robins and red-winged blackbirds going to and fro, each in their separate companies. At dawn their matins came swelling from the myriad feathered throats and then followed the successive rushing flights as phalanx after phalanx left the tree at the very instant of sunrise. Equally lovely was the return at sunset and the sleepy vespers that followed.

My great interest in all this was partially due to my being a shut-in. Things that I can see from my room grow large in importance, and so the laurel gradually became like a friend whom I could depend upon to be with me unfailingly.

The gardener, José Maria, who shared my devotion to the laurel, apparently loved only two things beside his plants; his son Raul, who was a slim brown boy of sixteen, and his liquor. Of these the prospering tree repaid him best, for the liquor engulfed him and his son feared him. But the tree and all other green things grew for him so splendidly that I wanted him to care for my small terrace of potted plants, and hired him to do so in his spare time, and in spite of my friends' warnings that José Maria was a drunkard beyond reforming.

When he first came to work he was carefully sober. Very tall for a Mexican, he was stoop-shouldered as tall men who are not quite sure of themselves often are.

But his smile was beguiling and his manner gentle. Transplanting cosmos seedlings, one fragile green feather in the hollow of his hand, his rugged face took on the tenderness of a mother contemplating her infant.

"*Las flores me encantan*," he said softly. And it was clear that flowers did indeed enchant him.

For several weeks José Maria came regularly to work, and my flower pots flourished exceedingly. He possessed something more than the proverbial green thumb. Once I asked him:

"Why do plants grow so well for you?"

"They trust me," he answered simply. It was a statement that I was to remember later with considerable pain.

Don José Maria taught me the Mexican names of my flowers. Fuchsias became *aretes*—earrings, and so they looked; old-fashioned bleeding heart had the Sacred Name of Jesus added, and with autumn came African marigolds as *flor de muerte*—"gold to cheer the dead." And so down a long list of fantastic identities. We gardened and talked, but every once in a while we would just sit gazing over at the laurel.

"It is probably the finest he-laurel in Mexico," he would invariably conclude, "due no doubt to the attention I have lavished upon it: more, *Por Dios!* than I would give to any woman!"

This was believable, for his own wife obviously led a wretched sort of existence. I had seen her hanging around the park on paydays apparently in the hope of catching Don José before his wages could all be spent on liquor, and generally speaking he regarded her and the small girl children much as he did weeds in the park—an inevitable nuisance provided by Nature. But Raul, the son, was another matter.

"He was the flower of my youth," Don José once told me with flamboyant pride. "Moreover, a son is a second *me!*"

Although presently I began to see evidence of his drinking, I forebore speaking to him about it until after the night he appeared at my house bringing a gift, a large bush of night-blooming jasmine planted in an old gasoline tin, in which two green onions had also sprouted impudently, their odors mingling with that of stale *tequila*. He presented the offering with a sweeping gesture that nearly cost him his balance.

"*Huele de noche!*" he said pridefully, giving the plant its local name. And indeed the night did smell, although not at the moment too sweetly. I accepted the plant with all due formality and Don José Maria departed much pleased with himself. Nothing was subsequently said about his nocturnal visit, but next time he came to work I caught him eyeing the jasmine and plainly wondering how the devil it had got there. I did not enlighten him, hoping there would not be another incident, but of course there was.

One day I discovered Don José weeding on the terrace. He was bent almost double, a half-empty *tequila* bottle beside him. Apparently the more he drank the more he stooped, until his tall frame resembled a question mark; which indeed perhaps it was. He had not heard my wheel-chair approach and he took a long gurgling swig before he saw me. And when I blasted at him with my frank opinion of his performance he was too drunk to care. He left and did not come back to work next day.

During the remainder of the week I occasionally glimpsed him—a horrid changeling staggering about in the park, fumbling at the plants, and yelling impatiently at his young son, who was trying to cover up for his father in order to hold down the old man's job. It was a sad comedy, as such things always are. And then one day tragedy took over.

I woke up at about five o'clock while the morning was still ghost-gray and was lying peacefully listening to the first sleepy twittering of the birds in the laurel tree. Suddenly there occurred a terrific explosion, so near at hand that it shook my windowpanes. I hardly had time to sit up in bed before there came a second explosion of even greater violence. I got up and made my way to the balcony, emerging to see hundreds of frightened birds leaving the tree with shrill, tuneless cries. They passed like a dark cloudburst across the brightening sky and in another minute all were gone.

Somebody else had witnessed the abrupt exodus: Don José Maria, standing in the shadows. And as I watched him he threw one last giant firecracker into the defenseless greenery. I knew those giant crackers. They are called *cohetes*, and are made with dynamite. The Indians use them on the church steps in order to call God's attention to the fact that they are coming to Mass. When the noise of this last *cohete* died down I shouted my protest, but it was wasted effort, for Don José Maria was full of liquor and bravado.

"I'm getting rid of the birds before spraying the

"I saw song sparrows, wrens, cardinals, wild canaries and even robins and red-winged blackbirds going to and fro. . ."

tree," he shouted back. "The tree has *moscas prietas* in it. I think! Maybe!"

"But I don't see any signs of them," I cried anxiously. "Think of the young birds in the nests! Wait! Wait and make sure!" But he would not listen.

I could only hope that the birds would return at sunset. And so they did. But the drunken gardener was waiting for them with more explosives. This time the birds understood and there was no evensong.

I could not sleep that night for thinking of the birds and wondering where they were, even though I knew wild birds understand how to use independence and true freedom better than any other living creatures.

In the morning the very silence aroused me, and looking over at the park the first thing I saw was José Maria Lavendera lying in a drunken stupor with his back against the silvery trunk of the laurel, his spray-gun in the crook of his arm, his big sombrero down over his eyes—a faithless guardian of the green things that trusted him! He had already sprayed the tree, and the air was heavy with the odor of Malathion, an extremely powerful insecticide, and I wondered how much of it he had already used. The doing of a duty, forgetting that it was already done and doing it again, was typical of heavy drinkers. I stood for a long while gazing at the silent tree, fearful and wondering.

Although the tree showed none of those cottony white *bolls* that characterize the attack of the *mosca prieta*, or black fly, on hard-leaf plants, I did know that there was an epidemic of the pest in town. I hoped Don José was doing the right thing, but at the moment I felt about the tree as I would toward some human friend who I suspected might be receiving the wrong treatment from an incompetent doctor. And when on three successive occasions during the day José Maria woke up and again sprayed the tree thoroughly and forcefully, expert advice seemed needed and I called the Department of Parks, only to find the place closed for a three-day national holiday.

By evening the laurel's leaves had lost their glitter and the topmost twigs, the thin golden aerials that had always seemed to me reaching for the music of the sky, were drooping. Under my breath I talked to the tree, begging it to take heart. I like to think that the laurel knew what I was saying. I hope so, because by next morning a dreadful change had taken place.

There is a big east window in my bedroom and the curtains were never closed because the green of the laurel tree filled the whole opening, softening the sunrise and helping me to face another day by the sheer beauty of its existence. But on this morning of new fatality strong light awoke me. Wondering what on earth had happened, I pulled myself up into a sitting position and rubbed my eyes.

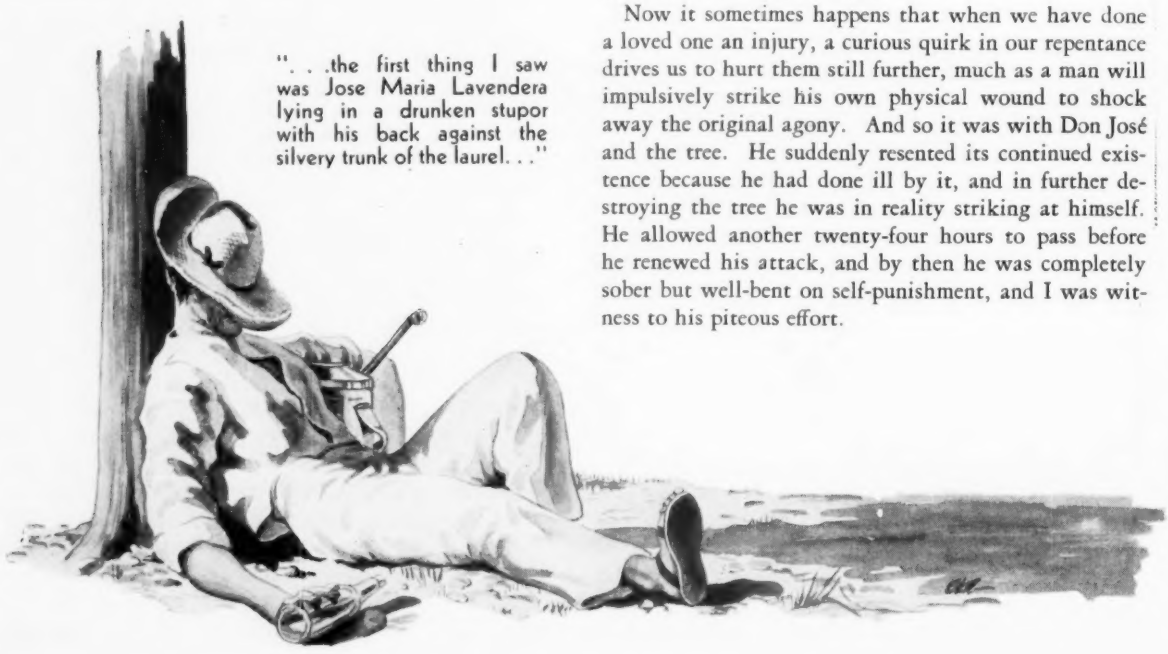
The laurel was gone.

Or so for a moment it seemed. Then I realized the tree was still there but had become a skeleton. Not a twig was missing in the whole seventy feet of it, but not a leaf was left. Against the sunrise its exquisite nude bones made a symmetrical pattern that was at first hardly visible. I struggled into my bathrobe and went to the balcony to see more of this evil miracle.

The tree had died—no doubt of that. José Maria stood embracing the bole, his face pressed against the gray bark, his shoulders shaking with sobs. When I called out to him he turned a tear-raddled face in my direction.

"*No me moleste*," he said. "I have killed the thing I loved best. Leave me alone!"

Now it sometimes happens that when we have done a loved one an injury, a curious quirk in our repentance drives us to hurt them still further, much as a man will impulsively strike his own physical wound to shock away the original agony. And so it was with Don José and the tree. He suddenly resented its continued existence because he had done ill by it, and in further destroying the tree he was in reality striking at himself. He allowed another twenty-four hours to pass before he renewed his attack, and by then he was completely sober but well-bent on self-punishment, and I was witness to his piteous effort.



". . .the first thing I saw was Jose Maria Lavendera lying in a drunken stupor with his back against the silvery trunk of the laurel. . ."

The denuded tree was surrounded by a dry pool of its dead leaves, and ankle deep in this I saw José Maria, a heavy machete in his hand. As I watched he raised the machete shoulder-high and struck at the bole. But the blow hardly marked the tight, tough bark. The man drew farther back and tried again, this time with such terrific force that the handle slipped through his fingers and the big knife, glancing off the tree, hurtled straight back at Don José, cutting a deep gash in his left cheek.

It was exactly as if the laurel had deliberately returned the blow of its tormenter. José Maria screamed and cursed and kicked at it.

"You'll pay for this!" he shouted. "You're dead! Stay dead!"

But if Don José was not through with the tree, neither was the tree through with Don José.

Holding his handkerchief to his bleeding face the gardener began calling for his son, and presently the sixteen-year-old came running, strong as a young bull, eager and alarmed. His father handed him the big knife.

"The dead tree must go," I heard him say. "Get up there and start cutting!"

With a look of love and fear the boy pointed to the ugly gash on his father's face, trying to speak. But José Maria only growled some obscenity, although Raul was clearly reluctant to obey his order. I noticed that the youngster was passing the heavy machete from hand to hand as he looked at the branches above him, which were wet and slippery with night-mist. But apparently the older man insisted, for presently Raul thrust the unsheathed machete through his belt, caught a lower limb with the help of a boost from his father, and began climbing.

"The dead tree must go," I heard him say. "Get up there and start cutting!"

No one in Mexico cuts down a tree if he can possibly help it, since good trees are now all too few. But when one must be cut down work is begun at the very top, never at the bole. First to go are the twigs, then the lesser branches, until at last only the main limbs and the trunk are left. All of this preliminary work is done with machetes.

Raul knew what to do, and he kept going up higher and higher until it seemed to me that the slender branches would not be able to hold him. And they did not. When he was almost at the top, the skeleton tree gave a sort of shudder, something crashed down through it to the ground, and there was Raul lying like a bundle of limp white rags at his father's feet. There followed the sound of a great cry, my own joining with Don José's animal howl.

Almost immediately I turned back into my room, closing the balcony doors behind me. But I could not shut out the sound of gathering people, the wail of the Red Cross ambulance, nor could I exclude the sickening sense of disaster that was flowing and ebbing around the house in recurrent waves. Then abruptly the street was silent—too silent. The crowds were gone and only the skeleton of the tree was left, trembling in a sudden wind.

For a long time I was left in doubt about the boy's fate. Don José Maria, his wife and the younger children vanished. I did not know where to send an inquiry after discovering that they were no longer in the warren where such people live, but I tried the municipal hospital. I thought the whole family might be sleeping on cots in the boy's room, as is the custom of the more humble Mexicans, who feel that the constant presence of the entire clan is necessary to a successful cure or even for successful death; a practice that the hospital authorities understand and permit. But all I could get from them was a statement that the family had gone back to their Earth—"*regressó a su tierra.*" As to where that Earth was located, or what the village was called, no one seemed to know. My servants, who dearly love to make the worst of bad news, for once could tell me nothing, and I could not even find out if Raul were alive or dead.

As the months went by the park was looked after in a desultory sort of way by the perambulating crew that performs the heavier work in our municipal parks. They, too, professed to know nothing about what had become of Don José and his family. But in a leisurely fashion they topped the laurel tree, gathering the twigs into bundles to be used as street-sweeping brooms; they hacked off the limbs and cut them into short logs that they left upon the ground to dry, and which the very poor came by night to steal for their cooking fires. Finally all that was left was the tall bole with the swelling at its top; the great cup from which the five main limbs had once sprung.

Now this remnant looked more than ever like a chalice set down by some giant hand. I wondered why it was not disturbed, but it was many months before I learned the reason. Meanwhile the wood hardened to the consistency of iron, the bark became even more silvery and, once the first sharp sorrow in my heart lessened, I came to see the tree that had become a chalice as a thing of beauty.

Then one day José Maria reappeared. He was so changed that at first glance I hardly knew him. He was sober, shaven and poised and, more remarkable, he

stood erect. The stoop that had been a badge of defeat was gone. He wanted his old job with me.

"You need not be afraid to hire me, Señora," he said before I could speak, "for I will not be drunk again—ever! The laurel punished me, but I deserved that punishment and I shall not forget." It was said so simply that I believed him. Truth is strong medicine but Don José had swallowed his dose of it. I mustered courage to ask what must be asked.

"What about the boy?" To my surprise the muscular shoulders squared and his head went up proudly.

"Raul will never walk again," his father said, "so I shall have to be man for both of us!"

This was more than a year ago and Don José Maria Lavendera has kept his word. He works his green magic on my flower pots, and once again the park across the little cobbled street blossoms like the balm in Gilead. Sometimes Raul is there, lying in the shade, and he and his father talk a little and laugh a little while the old man works at his gardening and at being man for both.

The chalice that was once a tree is still there. And now I know why it was left, for I was privileged to watch when Don José, his face full of the old tenderness, knelt before it to plant slips of bougainvillea around its base so that in another spring the tree will be clothed again in dignity, the chalice overflowing with blossoms, purple in color, royal and long-enduring.

Mother Tree of America

By RUTH H. DUDLEY

THE CANOE or paper birch, *Betula papyrifera*, is the State tree of New Hampshire and one of America's most striking trees. Truly an American native, this beautiful birch was used in various ways by the Indians long before the arrival of the white man. It was the Indians, of course, who taught the white man the art of making canoes from its bark.

This bark is soft, smooth, and snowy-white, with a delicate tan lining. It peels from the tree in layers, paper-thin, that are easy to write on, a characteristic that has lent the tree the name of paper birch.

The Indians found its bark strong, light, and watertight. They employed it as a covering and waterproofing for their tepees, and in making baskets and dishes of various kinds. For the manufacture of canoes, specially selected paper birches were stripped of their bark, which then was "toasted" over a fire to flatten it, and then placed over a form of stakes. Inside the form, the Indian craftsmen constructed a framework of cedar strips, over which the birch bark was sewed with slender root fibers, and the seams caulked with pitch to make the craft water-tight.

The canoe or paper birch, *Betula papyrifera*, is known as the "Mother Tree" of America.

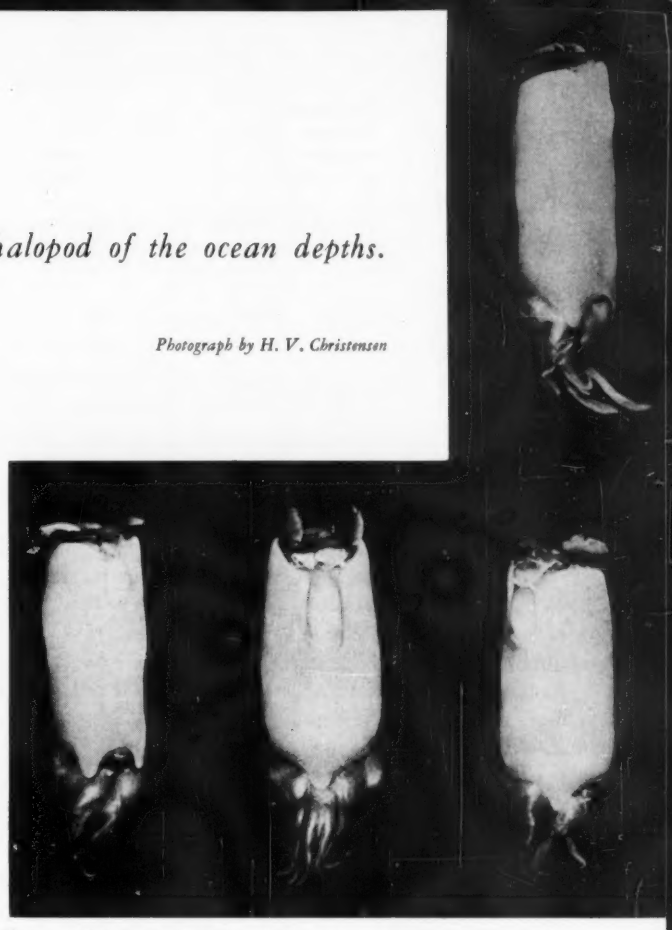
Most of us, nowadays, realize that the remaining stands of the white birch should be conserved, and a great step towards their conservation would be a halt to peeling the bark from the trees. It is true that the peeling of a tiny patch will not kill the tree. But it will leave an ugly, dark scar that will spoil forever the pure whiteness of the trunk, for the tree can never grow new white bark to cover the injury. And if the tree should be deeply girdled—a strip peeled from all around the trunk—the tree will die, since this stops the flow of sap, its life-blood.

In its search for a tree with which to honor American mothers, the American Forestry Association chose the paper birch. Thus, it has become known as "the Mother Tree" of America, and has been widely planted throughout the nation in tribute to the mothers of America.

Spirula—

an elusive cephalopod of the ocean depths.

By FRANK W. LANE



Photograph by H. V. Christensen

The cephalopod *Spirula*, elusive kin of the octopus and the squid, has a light brown, cylindrical body and eight short arms that spring from its head. The middle specimen in the bottom row of the photograph above shows the small light-organ between the fins. The shell has broken free of the skin in some of these specimens, but in life it is completely enclosed by a mantle.

WITHIN the seas of the world, there are countless millions of the cephalopod known to zoologists as *Spirula*, yet it is safe to say that nobody who reads this article has ever seen the little animal alive. It is so rarely observed that it has no commonly accepted popular name, and it is generally referred to by its Latin name of *Spirula*, first given it by Carl Linnaeus in 1758. In spite of its elusive existence, the shells of *Spirula* are washed up on the shores of all five continents, beaches sometimes being littered with thousands of them at a time.

There is only one species, *Spirula spirula*, and it is found in nearly all tropical and subtropical seas except the Mediterranean, the Red Sea and the Sulu Sea. It lives at depths between 600 and 3000 feet. Anton Fr. Bruun, Danish marine zoologist and the world's leading authority on this little animal, says that he considers it to be confined to water layers having temperatures between 10° and 20° Centigrade or 50°-68° Fahrenheit.

Spirula is a cephalopod, and is therefore kin to the octopus and squid that abound in American waters. It has a light, brown, cylindrical body that rarely measures more than one and a half inches, excluding the tentacles, which are another one and a half inches when fully extended. These, and the eight short arms, spring from the head, which is covered with the typical cephalopod pigment cells known as chromatophores.

When disturbed, *Spirula* can withdraw its head, arms and tentacles into its mantle cavity, the edges of which then almost close the opening. Bruun says: "Animals too small to swallow a whole *Spirula* may experience some difficulty in attacking one protected in this way by the mantle wall, which is very tough and slippery, and hard to get hold of."

Like other cephalopods, *Spirula* swims by jet-propulsion, a tiny funnel projecting from the opening between head and mantle. *Spirula* also has two small end-fins, and when it is swimming these frequently aid the jets from the funnel by a constant fluttering movement. Between the fins is a circular disk, with a small, bead-like organ in the center that emits a steady, yellowish-green light, which "burns" for hours. As the normal position of *Spirula* is vertical, with the arms hanging downwards, this disk acts as a top-light.

The source of the light is bacteria. Johannes Schmidt, the Danish zoologist who is one of the few men to have seen *Spirula* alive, says, of some that he watched in tanks on board the *Dana*, that they showed "a pale yellowish-green light, which from the normal position of the animal in the water is directed upwards. In contrast to the light displayed by so many other marine organisms, which flares up and fades away again, the *Spirula's* little lamp burns continuously. We have seen the lamp showing uninterruptedly for hours together." The bead-like light organ has a diaphragm above it that apparently turns the light off and on.

The function of the light probably is to enable a school of *Spirula* to keep together. Unlike the majority of animals, whose main movements are more or less horizontal, those of *Spirula* are mainly vertical, up and down through a half mile of sea water.

Before 1920, when the first *Dana* expedition set out under the leadership of Johannes Schmidt, only thirteen specimens of *Spirula* had been captured by all previous expeditions throughout the world. Schmidt's main task was to try to solve what was then one of the major mysteries of world natural history: Where is the breeding-place of the American and European river-eels? Schmidt found the answer—about a quarter of a mile below the surface of the Sargasso Sea. In his search,

As shown in this diagram, drawn by Patience Forman, *Spirula's* head is covered with the typical pigment cells called chromatophores. Shown also is the tiny funnel that projects from the opening between the head and mantle, and which enables the cephalopod to swim by jet-propulsion.

Schmidt trawled with special nets capable of catching tiny eel larvae. These nets proved to be ideal for catching *Spirula*, and as a result, Schmidt not only solved the mystery of the eels' breeding-place; he also brought home by far the largest collection of *Spirula* seen up to that time.

Bruun thinks the reason *Spirula* is so rarely caught is because too few attempts have been made to capture them in the right waters. He tells me that, trawling in the right place and depth, he once caught twenty-six in a single trawl.

When Bruun wrote his monograph, he had at his disposal nearly 200 specimens. He paid special attention to the shell, which lies inside the top end, just below the end-fins. It has a diameter of about half an inch, is coiled in a flat spiral and, despite statements in numerous text-books to the contrary, is completely enclosed by the mantle. The reason for these mis-statements is probably because, when preserved, the mantle is often frayed and the shell protrudes, as shown in the photograph. Bruun observed *Spirula* both alive and dead, and had X-ray and ordinary photographs taken of them. He confirms that the shell is enclosed. The shell is divided into twenty-five to thirty-seven chambers that are filled with gas and air. A delicate, hose-like extension of the body, called a siphuncle, runs through the chambers.

Spirula sometimes descends half a mile below the surface of the ocean. How is it that this half-inch shell can remain unbroken at depths where its surface sometimes must sustain a pressure of nearly half a ton? The answer is that the gas secreted by *Spirula* inside the shell presses outwards with the same force as the sea water presses inwards. Without such an equilibrium of pressure, the tiny shell would be smashed to powder.

But this raises another question. Why, as the animal rises and the sea pressure diminishes, is there no sudden outburst of compressed gas to shatter the shell? The answer is not known. One theory maintains that the pressurized gas escapes by diffusion through very fine pores in the shell. Bruun, however, says: "I am not quite sure that the shell is porous when the animal is alive. It may only be when all the organic matter has rotted away that it is porous and the air can escape in that way. When the animal is alive the surplus air may be carried away by the blood of the animal."

Whatever the mechanism may be, as the shell ascends, the gas slowly discharges, keeping an equilibrium of pressure with the weight of sea water outside. This is why shells of dead *Spirula* can make a journey through a vertical half-mile of sea water, with pressures varying between half a ton and a few pounds to the square inch, and land unbroken on shore.

But this is not the end of the natural mechanics of *Spirula's* half-inch shell. It is built on a plan that makes the utmost of the few grains of material available. The shape is that of a slightly corrugated cone wound in a spiral. It is reinforced by the two to three dozen inner walls that separate the numerous chambers, and also by the corrugated pattern of the shell. Moreover, the whole shell is not made of one layer of a single substance, but of alternating layers of a horn-like material called conchiolin, and calcium carbonate. These layers are almost infinitesimally thin, each measuring about one twenty-five thousandths of an inch; but the effect is to achieve on a Lilliputian scale the characteristic strength of any multi-ply substance. Thus, by its porosity, the shell is enabled to resist the everyday pressures to which it is subjected, and by its structure and material it is reinforced to withstand any sudden variations of pressure.

COUNTRY CHRISTMAS

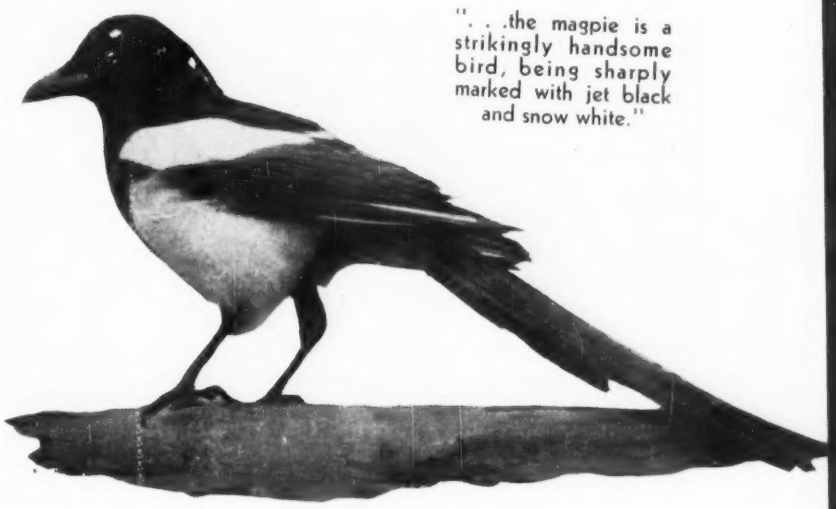
The country keeps Christmas with quietness, drifting
snow over hills and through valleys, lifting,
above the woodland, the moon and star
to shine down where sheep and cattle are
huddled together in dark humps, sleeping.

While over the hills, the cities are keeping
Christmas with singing and ringing bells,
through country sky a silence swells—
and it is rife with mystic things
like the pause after angels fold their wings!

Helen Harrington

Magpie Metropolis

By ROBERT B. McCOY



". . .the magpie is a strikingly handsome bird, being sharply marked with jet black and snow white."

WHERE the Missouri is still new, midway, almost, between Great Falls and Fort Peck Dam, in Montana, the river has carved a strange, deep and mysterious gorge that the local people call "the breaks." It is a weird, lonely land, scarred and wasted by deep erosion. At every turn of the river there opens a new vista of forest-crowned buttes, fantastic red rimrocks, and countless gaunt canyons seemingly filled with whispering pines and restless balsam trees.

The days are silent, with the sounds of Nature only emphasizing the stillness. The water of the river is quiet here, icy yet from the mountains to the west where it rises, but carrying now the brown, suspended burden of its eternal carving.

We camped a month in this place that time and people seem to have forgotten, and found it a paradise for wildlife retreating from civilization. In this short span of time we saw deer, antelope, bear, elk, badger, raccoon, coyote, beaver, fox, and porcupine; and we found ourselves literally adopted by a colony of watchful gophers and whistling prairie dogs. Of birds, we saw eagles, ravens, ospreys, hawks, quail, meadowlarks, sage grouse, partridge, waterfowl of all kinds—including a pair of addlepated loons—and a magnificent rookery of magpies. We saw tracks and other signs of timberwolf, wildcat, and, on one occasion, padprints of a catamount.

Being Nature observers, rather than wildlife hunters, we were particularly interested in the magpie metropolis. All our fieldbooks together yielded only a modicum of information about this big, beautiful jay, so we spent considerable time watching its communal activities from a blind we thought we had hidden in a place nearby.

To the naturalist, the magpie is *Pica pica hudsonia*. Like all jays, it is a strikingly handsome bird, being sharply marked with jet black and snow white.

Over-all, the magpie is a black bird, with head and neck iridescent like that of a pigeon. Elsewhere, this black is *so* black that in the sunshine it sometimes appears blue. The shoulders, lower breast, upper abdomen, sides and flanks are shining white, which never seems to get dirty. The beak is strong and black, with the characteristic jay hairs about the nostrils. The feet are black, too, with three toes forward and one back.

The adult male will sometimes reach 21 inches in length, but at least 10 or 11 inches of this is tail. We netted four to weigh them, and despite their appearance of size, they are surprisingly light. One male weighed six ounces, another six and a half, another six and seven-eighths; and the one female weighed four and three-quarters. The body is about the size of a large turkey drumstick, and the flesh is so dark it is nearly black in color.

Apparently there is no difference in coloration between the male and female. Our distinction on the netted birds depended on a bare breast that we took to indicate a brooding hen. Since the magpie will sometimes eat carrion, the birds we handled had an unpleasant odor about them that was in unfortunate contrast to their beautiful markings.

One other sorry thing; we handled the birds without gloves, which was a sad mistake. It was not the pecking, which was savage enough; it was the inhabitants! We soon noticed the mites and lice on our hands and arms, and examination of the captive birds showed more such vermin than we could believe! Later, we saw sick birds die, which, when examined under a big glass, appeared to have been *eaten* to death by mites and lice.

Anyone who has traveled through the prairie country and low mountains has seen the magpie; he flies rather slowly, seldom high, and this is probably due to his moderately soft feathers, which are not designed particularly for either speed or secrecy in flight. One oddity of his flight pattern is his habit of holding the long tail twisted from its logical horizontal plane to form a vertical rudder. He uses his secondary wing feathers as a brake when alighting; his tail is utterly useless for anything but turning to the right or left in flight.

The rookery was located in a dense copse of western haws, set near a large, sloping meadow and surrounded

on three sides by pines, hemlocks, spruces and balsams. On the fourth side reared the abrupt and serrated red rimrock so conspicuous throughout the gorge. These haw trees ranged upward to about twenty-five feet, and we counted eighteen magpie nests in an area of less than half an acre.

We had noticed few other birds in the vicinity, so to test our suspicion we set some of our breakfast eggs one morning on a stump near the rookery. In less than five minutes there was a battle royal under way, with shrill and indignant screams bringing nosy interlopers from every direction. Jays everywhere are, as a rule, cannibalistic; these were no exception. Everybody wanted a bite of those eggs!

The magpie's nest is a real masterpiece of bird architecture. We found several nests as big as nail kegs, averaging, though, to about the size of large pumpkins. These are painstakingly woven, with many thorned branches pointing outward, as best a harried hen can do it. The intersticing twigs and branches are "tied" together with long strands of yucca spines and grasses. The entrance is a hole at the side.

We watched a mated pair building their home. The male helped now and then, but he was disagreeable and aggressive toward the hen while she worked busily. She submitted meekly—almost indifferently—to this heckling, even sometimes taking the magpie version of a severe drubbing. Her only safety seemed to be inside the nest, even if it was only partially completed.

As we discovered after several days, she worked to finish the nest even after she had started to lay. She actually did not start brooding until she had laid eight greenish-white eggs, each of which was mottled with great buff, brown and purple splotches. This meant the eggs would all hatch at about the same time.

We were unwelcome almost from the moment we appeared on the scene. We thought to build a blind from which we could see without being seen, but we underestimated our friends. We built a blind, all right, but we used it more for protection from the magpies than for a private observation post. Our camp was fully a mile from the rookery. After the first time we approached the metropolis, we never were out of sight of at least four of the males. They watched us all day, every day, and, we think, at night.

But wherever we were, if we started moving toward that rookery, there was a most appalling chorus of shrill yells and furious screams. The closer we came to the nesting area, the bolder became the defenders, and the angrier. Their main point of attack was always right at the eyes.

Once, in the first few days, we were actually overwhelmed by the fury of the reckless onslaught, and fell prone to the ground. In moments we were covered by the flapping birds, each one trying to find something to bite besides clothing. We came out of the fracas dizzy and bedraggled, and for lack of a better idea, beat a swift retreat. This delighted the magpies so much they followed us to the camp, remaining until nightfall.

As days went by, we half won them over by freely scattering our bread supply. We discovered if we spread food around our campsite during the night, and then entered the blind before daybreak, we could fool these smart birds—until the food was gone, at least. At first they did not know we were in the blind, although they knew it was there. But after a while they got to climbing around over it, peering suspiciously through holes and cracks.

It is disconcerting, indeed, to peer through a hole squarely into the beady eye of an angry bird peering through at *you*. The moment we were seen inside, there was that nerve-wracking explosion of triumphant, half-delighted, half-frightened screams and yells so characteristic of excited magpies.

In time, we became little more than an oddity to the avian community, and by the third week we began even to be welcomed, although some birds obviously had noisy reservations about this. We had to do our observing while the food supply held out.

By bunching the birds over a loaf of crumbled bread, we could walk about and peer around. We found the nests were well constructed, inside as well as outside—at least, those that we could reach through the haw trees. In some cases the inside was plastered with dried mud and stuck with grasses, and in others there was a lining of breast feathers and sometimes thistledown. We found several nests within nests, suggesting the rookery was an old one used again and again. Our visit was in June, and we found young from newly hatched to freshly weaned, which indicated an erratic and continuing mating cycle for the magpie.

The young are fed live crickets, grasshoppers, worms, dragonflies, lizards, almost anything, apparently, that can be stuffed and pushed down the big, wide-open maws of the youngsters. We watched one hen feeding a baby about three weeks old; apparently it had left the nest a little early and was perched on a twig outside awaiting special service.

Mother settled down with a lizard of some sort, which from where we sat appeared about half as big as the baby. However, nothing ventured, nothing gained. The baby opened up. Mother deposited the kicking lizard, head first, and then began hammering at it for all she was worth. The baby screamed, almost strangling. The lizard kicked. Mama was muttering, probably afraid to open her mouth loud enough to scream. Other magpies gathered around to watch, becoming vastly excited as the contest progressed. Finally, the lizard was down far enough so that it could not come back up, but the tail still stuck out of the baby's beak.

The newly hatched babies are blind and downy, having an incubation of about twenty-four days. They are fully feathered at five weeks, and they learn to fly within a day after they are weaned. When they can fly, they also are left to shift for themselves.

The magpie in the community seems to be monogamous, and this may be due to the jealousy clearly evidenced by the male of the pair. (*Continued on page 550*)

Three Steps in Evolution

By EZRA ALLEN

Representatives of three stages in the evolution of flowering plants—ferns, horsetails, and a Jack-in-the-Pulpit—were photographed by the author growing together at the edge of a swamp near Flushing, Long Island.

One sunny morning while I was walking along the edge of a marsh on Long Island, not far from New York City, my eye fell upon the group of three plants shown in the photograph at the right. To the student of Nature, the unusual is of great interest, and I studied the three plants intently. The group illustrated three steps in the evolution of flowering plants. The two clumps of fern were unrolling their leaves, and I was reminded that, as a boy, I saw this same species six feet high. It has been named the "cinnamon fern" because it produces a dark brown, fuzzy stalk in the center of the clump of leaves. The fuzz is composed of thousands of tiny, almost microscopic spores. These fall to the ground and act like seeds to produce the next year's ferns. Most of our common ferns bear their reproductive spores on the under surfaces of the leaves in many thin-walled, flat coverings called "sori." It is easy to count the number of sori to a leaf, but not so easy to enumerate the vast number of spores they produce.

Just behind the ferns in the photograph appears a quite different kind of plant, the horsetail, so named because of its resemblance to a horse's tail. Its hair-like branches are quite stiff, and have no true leaves. Horsetails have two kinds of stems, the ones in the photograph being sterile. The other stems are fertile. The reproductive spores are borne at the top of the stem in a cone-like body, and the narrow, stiff, awn-shaped leaves grow in circles along the stalk. Most species make plants only a few inches high, but one attains four feet. American pioneers named horsetails "scouring rushes," because there is so much fine sand in their stems that they could be used for scouring.

Both horsetails and ferns started their careers on earth millions of years ago. The two plants were so abundant then that they form part of the coal that is mined today. Some kinds grew to large trees. Even today tree ferns eighty feet high are found in some tropical countries.

The flowering plant in the photograph is called "Jack-in-the-Pulpit," because the arching, leaflike, striped hood resembles the hooded pulpits to be seen in some churches. Inside, "Jack" is a smooth stalk that appears under the open hood. The lower part of the stalk bears the pistils and stamens, the seed-producing organs. This flower differs from most of our wildflowers in having neither petals nor sepals.

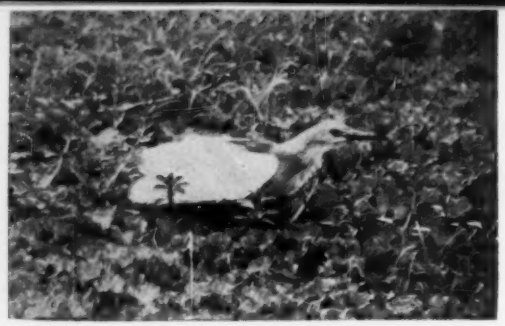
This plant also is called "Indian turnip," because of the turnip-shaped root that the Indians were said to have eaten. But a single bite of the peppery root usually suffices for the modern white man. In summer the scarlet seeds form a conspicuous naked bunch at the top of the stalk, the hood having previously withered.

An interesting idea came to my mind when I saw this cluster of widely differing plants growing so closely together that their roots intermingled and drew most of their food from the same area. My thought was that, in spite of the intimate association, each plant retains its own individuality of structure and habit of growth. Hereditary forces have preserved the characters of these plants over the ages.

ONE WORLD

By Bessie F. Collins

No social climber is the bee,
For he can sup,
With equal relish from a rose
Or buttercup.



The Indian pond heron is a friend of the farmer, feeding on crabs that are destructive in the rice fields and removing the ticks that annoy the farmer's cattle.

The Indian Pond Heron

By S. V. O. SOMANADER

Photograph by the Author

FEEDING in the shallows of ponds, tanks, streams and moist paddy-fields—rice fields—is the Indian pond heron, *Ardeola grayi*, a bird that never fails to lend a touch of color to any open, aquatic scene. This wader occasionally is found fishing at the seashore, too. Blackish-brown on the back with white plumage hidden underneath, these wading birds, with their heads drawn in, stand so motionless that one might easily mistake them for pieces of wood.

The Indian pond heron feeds on fishes, crabs, frogs and insects, and the way in which it secures its prey is really remarkable. First, a bird stands motionless by the water's edge, or stalks slowly through the shallow water. When a fish swims by, the S-shaped neck is stretched out and the victim is secured with a quick dart of the bird's head. The captured food then is swallowed whole at one gulp.

In my district on the east coast of Ceylon, the pond heron is called—in Tamil—by a name that means "tick-heron," because of the bird's habit of settling on the backs of cattle to peck vermin from their necks and ears. As a reward, so to speak, for such service, the feeding mammals help the pond herons to find food easily by disturbing grasshoppers and crickets and causing them to fly. This, of course, is why pond herons follow cattle and often take long rides on their backs.

Pond herons also are called "blind herons" by the Tamils, for the birds allow people to approach them quite closely before taking wing. It should not be supposed, however, that the bird's eyesight is not good.

The pond heron has no song. It can, however, utter a husky *kwark-kok*, not unlike the croak of a frog, and the bird repeats the note several times. This sound is made even when the heron is feeding, and it might be speculated that its frog victims are lured in this manner before they are seized by the long, pointed bill. After a good meal, and when the day is done, the birds—if they are not breeding—roost either singly or in companies, perhaps two score or more on a tree, where the occupants quarrel for the best branches.

I have noticed that, in my locality at least, pond herons breed nearly all year around, although chiefly in March and April. They build their nests in colonies in trees overlooking the feeding grounds, which may be large irrigation reservoirs or lagoons. It is interesting to watch a breeding pond heron stretching out its neck, with bill upraised, looking for dry twigs with which to build its stick nest. The heronries are small stick-platforms placed in the forks of branches, and sometimes, to add a measure of safety, the chosen trees are standing in water that may be several feet deep. Predatory animals like monkeys, squirrels and snakes thus are discouraged, and four greenish-blue eggs are usually laid.

Nests belonging to egrets, night herons, and even weaver-birds may sometimes be seen in a colony of pond heron nests. The nesting birds seem to like company, no so much for "gossip," probably, but for protection against common enemies. Carnivorous birds—which often keep a sharp lookout from the leafless limb of some tall tree—take a heavy toll of the young pond herons, and I have often found only a single heron fledgling in a nest where I knew four chicks were hatched. But this, of course, is all a part of "the balance of Nature."

Pond heron chicks are helpless when first hatched. As they grow into fledglings they resemble the adult birds, differing from the adults only in size. It is fun to watch the growing chicks "crossing beaks" with one another and showing themselves as fidgety "young hopefuls."

A curious thing about the pond heron is that during the breeding season its head and neck are tinged with grayish-yellow, with a crest of from two to four white streamers. Although the breast is still white, the back feathers assume a deep maroon color tinged with black.

The pond heron may be regarded as a friend of the farmer, since it feeds on the crabs that are destructive in the paddy fields; it eats the paddy-bugs that destroy the farmer's crops, and even removes the ticks that feed on his cattle. It is fitting, therefore, that the government of Ceylon has declared the pond heron a "protected" bird, and has introduced legislation to prevent its wanton destruction by "sportsmen."

A strange phenomenon of the bayous was the

Dance of the Mosquitoes

By ERNEST WANDER

WHERE the shores of Louisiana skirt the Gulf of Mexico there lies a strip of territory that is neither dry land nor sea, but a combination of both. It is the salt-water marsh, interlaced with meandering bayous that are hidden from view by vast areas of billowing reeds and grasses. The level surface of the marsh, elevated only a foot above tidewater, is usually covered with innumerable small, shallow pools, each but a few yards across, and separated from one another by clumps of root and stubble. Here is where the muskrat raises her family in a cone-shaped nest, and the pools serve as ideal breeding grounds for salt-water mosquitoes.

Three months had passed—February, March, and April—without a drop of rain. The bayous had drained away the water from the spongy ground, and the wind had dried the black muck until its surface presented an unending pattern of large and small cracks. The multitudinous swarms of mosquitoes that had infested the area had vanished. No longer did their continuous hum pervade the lonely, monotonous landscape, and their annoying sting had become but an unpleasant memory of the local trappers and fishermen. Then came the rains. Each day and each night, for a week or more, it rained. The parched earth greedily drank up the water, and, as before the drouth, the great expanse of the marsh was again covered with a limitless repetition of shallow pools amid a sea of grasses.

While walking across a meadow one evening I looked toward the bay, where the placid surface of the ocean reflected the enchanting colors of a semi-tropical sunset. A strange phenomenon riveted my attention. The entire atmosphere over the nearby marsh was filled with thousands of wraith-like, cylindrical columns, each composed of myriad milling, gyrating mosquitoes. The dense masses of insects, resembling columns of fog one or two yards in diameter, reached from earth seemingly to sky, and all were inclined slightly from the vertical, at an identical angle. What I saw gave rise to the illusion that all the world's mosquitoes had congregated here to engage in a gigantic multiple maypole dance; the "maypoles" of dancing insects extending as far as the eye could see, all slowly moving inland, impelled by the gentle evening breeze. Spellbound, I watched the extraordinary spectacle; the unending multiplications of the same pattern, the individual insects flying in their characteristic zig-zag fashion, spiraling about the center of one of the countless cylindrical formations. The slow movement of the columns continued until the darkening of the sky prevented further observation.

I was puzzled as to the probable reason for this unusual phenomenon, and the following explanation suggested itself. The prolonged absence of rainfall and the consequent dehydration of the marsh had resulted in the destruction not only of all mosquito eggs and larvae, but also of most other organisms that live in or near the pools. Only the crawfish was able to dig down to moist earth and survive. Then, finally, the rains had come, and pools of water again covered the many miles of marshland. The west wind had brought a new swarm of mosquitoes one day from Marsh Island, thirty miles out in the Gulf. Many of the females had deposited their eggs in the pools, all on that same day. And because the pools were utterly devoid of the usual predators, nearly all of the eggs hatched, filling each pool with millions of tiny wrigglers. These reached maturity at the same time, rose to the surface, dried their wings, and took to the air, a separate swarm from each pool. As distinct family groups they then commenced their birthday dance, spiraling slowly skyward and filling the atmosphere with the fog-like columns. The west wind, that had helped to bring them life, then carried them onward to their destination.

SNOW

The forest view in Autumn hue
Is rife with squeals and scrabbling,
While distant fields surrender yields
Of rodent-rendered babbling. . . .

But from the new and colder blue
A whispered hush comes calling;
In tiny motes, in crystal notes,
A lullaby is falling. . . .

A. Kulik

The pine siskin, one of the truly unpredictable members of the bird kingdom, usually chooses a nesting site on the horizontal branch of a conifer, where the female lays from three to six greenish, spotted eggs.

Illustration by Hope Clifton

Vagabond of the avian world is the pine siskin,

A Bird of Impulse

By LLOYD SCHERER, JR.

You never know when the pine siskins may come. It may not be for years; then one day a few of them streak across the sky, sweep low over field and woods. Soon flocks seem everywhere, feeding, darting, calling in wild abandon. When we begin to forget they had not always been there, they vanish, without apparent reason.

Most birds live by fixed patterns of seasonal homes and orderly migration; but not the pine siskin. Impulsive as an individual, impulsive as a flock and as a species, it wanders by its whims, shows up from time to time anywhere from the northern limit of trees in Canada to Mexico, or even Cuba.

This remarkable little bird is a bullet-like member of the sparrow, or finch, family. Its plumage is streaked with dark, partially broken lines over a brownish back and pale breast, and it shows a glint of yellow in wings and tail. During its wintertime ramblings it likes to join redpolls, goldfinches and crossbills—its closest of kin. Although occasionally it strays alone, generally it roves in tight flocks of up to thirty or forty birds, at times up to two hundred. In flight it occasionally calls a cheery *tit-a-tit*, and often it emits a buzzy but extremely forceful *zreeeeee!*—a distinctive call that expresses much of the siskin's wild nature.

The siskin feeds on seeds, any small kinds available, from the cone-clustered peaks of spruce and hemlock and the fruiting bracts of birch and alder, to lowly weed patches. The flocks feed with exuberance, sometimes plain crazily, and ever noisily. Each bird will appear entirely absorbed in its own energetic feeding, to the apparent exclusion of all else about it. Yet if you alarm them, every bird, as if somehow connected by the same nerve fibres, shoots away in the same instant.

So strong is its flight that a siskin can launch straight up like a rocket, not arching away until clear of the treetops. And it is unbelievably fearless of the wind, so much so that it often shows real delight in flying in stormy weather.

At times the species seems too irresponsible even to

perpetuate its own race. But each year in several broad areas—perhaps parts of the northern United States, or the Appalachian ridges, or the Canadian spruce forests, and chosen portions of the pine-fringed Rockies, the Cascades and Sierra Nevadas—whole populations of siskins suddenly mate, build nests, rear their young and move on.

When the mating urge possesses the flocks, sometimes while deep snow still covers the ground, male siskins pause in sunny treetops and pour out their feelings in rambling strains of rising and falling notes. Then, with characteristic vigor, they chase one another in rising, twisting, plunging flight through the forest. Meanwhile the females search out nest sites on long, horizontal branches of conifers, six to thirty feet up, and there construct sturdy, six-inch nests of coarse, fibrous exterior materials and soft plant parts and fur for the innermost linings.

One April, during a cold, west wind that carried a half rain, half snow, I watched a siskin building her nest. Her choice of site was no ordinary evergreen branch, for she had selected the limb of a red pine that hung over the brow of a cliff where it was exposed to the fullest fury of every gale. While I watched, the wind blew the branches about so violently that it seemed impossible for any small bird to have clung there, much less carry on home building.

But time after time the tiny siskin appeared from the sky—as easily as if the storm did not exist—and perched abruptly upon a tossing branch. In her beak she brought shreds of birch bark and sometimes dead pine needles, and wove them into the beginnings of her nest in a group of needle-tufts. As she continued to build, the wind tried to tear the nest away, but her workmanship proved sound and the nest held. In such a wildly rocking cradle the siskin would lay three to six greenish, dark-spotted eggs, and before long they would be hatched. The fledglings would grow rapidly, I knew, and within a few weeks would be on the wing—to drift away with their parents while learning the secrets of strong, fierce flight. Quickly they would become spirited vagabonds, as do all siskins.

MEADOW RHAPSODY

Softly tread the grassy paths
Led by daisies and clover,
Nodding their vagrant heads
Calling you over and over.

Deep the swampish places
Holding rose, and gold and blue
And the tall white swayings
Of feathery Rue.

Laden, the meadow air
With its silken music of many wings,
And the purple haze
Where the Night Moth clings.

Have you seen the meadow
Felt its fragrance
Stood inarticulate
When meadow winds dance?

Then you are part of the rhapsody,
Part of the Song.
One of the meadow's
Lilting throng.

Elizabeth Phillips Jones

Swallowtails on the March

By PAUL E. STONE

Illustrations by the Author

THE giant swallowtail, *Papilio cresphontes*, is probably our largest eastern butterfly, and is quite common—sometimes even considered a pest—in the orange groves of the South. According to one authority, the insect is not considered rare in southern Michigan, where I live, but it was certainly rare in my own area until recent years. It is listed as "gradually extending its range to the north," or "sporadically extending and contracting its range."

To my own knowledge, the giant swallowtail first appeared here in the spring of 1955, although I am quite sure that I saw a single specimen in August, 1954, while on a collecting trip for the caterpillar of the imperial moth. But, since it was a fleeting glimpse, I may have been mistaken, for I could think of no locality within ten miles where the prickly ash, the giants' northern food plant, might grow. Prickly ash is abundant near my home, and I had kept up the search for *P. cresphontes* for several years, both for adults and larvae, and know they had not been in the area—at least not in any numbers.

In the spring of 1955, I kept a close watch on the woodlands where prickly ash grows, but the first giant positively identified was a male—caught by my wife—feeding on spirea in our yard, more than a mile from any prickly ash localities.

The larvae of the giant swallowtail go through the chrysalid stage attached to the branches of trunks or trees.

In early June, while making a trip to one of three good stands of prickly ash in the vicinity, I saw what I had been seeking for more than four years.

On entering the woods, the first thing I saw was a giant swallowtail floating lazily about a thicket of prickly ash. It was a female, for after considerable following and watching I was able to collect two spherical, pale amber-colored eggs. They were not shiny, as are most *Papilio* eggs, but appeared to have a slightly rough surface. Before leaving the woods I found five small larvae, easy to locate because of their habit of resting on the upper sides of the leaves in the same manner as do the larvae of the common, or spicebush, swallowtail.

They differ from the tiger larvae in one respect, however. In the last larval stage, they forsake the leaves, except when feeding, and rest on the branches, usually on the main trunk or stem of the bush, sometimes quite near the ground. At this stage they show an inclination toward protective camouflage, for their beautifully mottled colors of chocolate-brown and cream blend well with the grays of prickly ash bark.

The two eggs I secured that day hatched in eight days, and I found the larvae somewhat more easily raised in captivity than those of most swallowtails.

Caterpillars of the giant swallowtail feed on leaves of the prickly ash.

Although I searched diligently in prickly ash woodlands not far distant throughout the first brood season—late May to mid-July—I could find no larvae. Throughout the spring the only adult seen anywhere away from the first concentration was the lone male captured in our yard.

On continuing my search during the second brood period, however—from early August until frost—I found that the insects had invaded another of the prickly ash woods, and that I could secure larvae in considerable numbers.

In the spring of 1956, in late May and early June, *P. cresphontes* was beginning to outnumber both the tiger and black swallowtails, leaving only the common spicebush swallowtail to compete in point of numbers. At the start of the second brood, in late July, I saw adult giant swallowtails flying in prickly ash woods several times.

Throughout August and September, I could find innumerable ova and larvae in the three favored woodlands, sometimes as many as a dozen on one small bush. Of the many specimens I have reared to adulthood, I have seen only one case of parasitism.

At the close of the year 1956, a fine colony of giant swallowtails had definitely been established in northeastern Jackson County, where I live. It will be interesting to see if it can keep its foothold!

In English prose and poem
there has always been a place for

Alleged She-Songsters

By W. L. McATEE

As a general rule among birds, song is restricted to males; yet in literature—especially that of olden times—the singing bird often is referred to as female. This is not mere poetical license, as it occurs also in prose, and is embodied in folklore. One wonders why; but a review of examples well may precede any attempted explanation.

Three such examples may be quoted from *The Boke of Phyllyp Sparowe*. The date of composition of this piece is unknown, but its author, John Skelton, lived from about 1460 to 1529. He mentioned numerous birds in the "Boke," but only the following as feminine vocalists. The spellings are modernized.

"The mavis with her whistle
* * *
The throstle with her warbling,
The starling with her brabling."

The species referred to are the European song thrush, the missel thrush, and the common starling, the last so familiar as an introduced bird in America. Skelton is confirmed as to the sex of the song thrush by other poets. John Clare (1793-1864) wrote:

"I heard from morn to morn a merry thrush
Sing hymns to sunrise, and . . .
* * *
I watched her secret toils from day to day—"

And in *The Armony of Byrdes*, assigned by H. J. Massingham to the Middle Ages, this bird has a stanza, part of which is:

"Then sang the avis
Called the mavis
* * *
Her notes around."

Chaucer, who first demonstrated the complete serviceability of the English language in the writing of poetry, gives an early—about 1386—instance of feminizing the singing skylark, one of the Old World's most famed songsters. The reference:

"The bisy larke, messager of day
Saluëth in hir song the morwe gray."

He was followed in that sexing, at approximately the dates given, by John Lyly (1590), William Shakespeare (1593), Edmund Spenser (1595), and John Clare (1820), and had been preceded in another language by Dante (1300), who in translation says:

"Like the lark . . .
. . . thrilling out her last sweet melody."

It seems that most birds called "linnet" are good singers; in fact, this name has been used practically as a synonym of "songster." The European linnet, akin to our redpolls, has been called a "she" by one of the most recent poets to use that figure of speech—James E. Flecker (1884-1915):

"A Linnet who had lost her way
Sang on a blackened bough in Hell."

The European swallow, of the same species as our barn swallow, while not popularly recognized as a songster, twitters, bubbles, and trills in a pleasing way through long days and a full season. But to some of the poets this is a maternal, not paternal, chant. John Dryden (1631-1700) wrote of the bird:

"This merry chorister had long possessed
Her summer seat, and feathered well her nest."

And Swinburne, in 1866, hailed the bird as:

"Swallow, my sister, O singing swallow."

Bird song may be technically defined as a specific utterance of the male, employed in courtship and in the guarding of territory. So understood, the special nesting season calls of such birds as the European cuckoo, turtle dove, quail, and the house sparrow may be recognized as songs. In any event, they have given poets warrant for our subject figure of speech; namely, attributing to the female a trait peculiar to the male. From an epigram written by Thomas Heywood in 1587, we quote: "In Aprill, the Kuckoo can sing her song by note." And there is an English folk rhyme that goes:

"The cuckoo comes in April
And sings a song in May;
Then in June another tune,
And then she flies away."

Among the *Poetical Sketches*, published by William Blake in 1783, there is one related to the turtle dove, a bird known in our country only in aviaries. A few lines read:

"And the turtle buildeth there.
There she sits and feeds her young,
Sweet I hear her mournful song;"

This gives the critic an excuse for pointing out that the

'mournful" quality, assigned to the song of this bird—as also to that of our mourning dove—is an inference by the human auditor. So far as the birds are concerned, the tide of the year is at full flood, the joy of living at its peak; if they could mourn, they would not do it then.

The European migratory quail, a smaller bird than our bob-white, has folk names suggested by its call. That note, although normally rendered only by the cock, has by some twist been connected with the hen. John Clare—date of publication, 1821—writing on a "Quail's Nest," said:

"I wandered out one rainy day
And heard a bird with merry joys
Cry 'wet my foot' for half the way;

* * *

I wondered what the bird could be,
And almost trampled on her nest."

The house, or, as we say, English, sparrow was long called Philip, or Philip sparrow. It would seem sheer perversity to dub this Philip a "she," but it has been done. In *A Book of Ayres*, collected from old sources by John Bartell, we find an example:

"Of all the birds that I do know,
Philip my sparrow hath no peer;
For sit she high, or sit she low,
Be she far off, or be she near,

* * *

She chants, she chirps, she makes such cheer."

Reserved for the last is Europe's famed avian melodist, the nightingale, for which the material alleging femininity of the singing bird is most copious and most illustrative. In English verse it is not easy to antedate Chaucer, and we find in him an instance to our point. Writing about "the briddes in May," he said, in part:

"Then doth the nightingale hir might
To make noyse, and singen blythe."

The Elizabethan and other early poets employed this conceit, as did also the Victorians and the pre-Raphaelites. One of the latter, Christina Rossetti, wrote two stanzas (about 1860) that illustrate not only our main point but also show that one poet, at least, did not adopt the imputation of sadness that characterizes various references to the song of this species. (Like the "dolefull'st ditty," Richard Barnfield, about 1595).

"Hark! that's the nightingale
Telling the selfsame tale
Her song told when this ancient earth was young;
So echoes answered when her song was sung
In the first wooded vale.

"We call it love and pain
The passion of her strain;
And yet we little understand or know;
Why should it not be rather joy that so
Throbs in each throbbing vein?"

Identification of the singing nightingale as the female was made by prose writers also, for example by Charles Armitage Brown, to whom we are indebted for the preservation of Keats's unparalleled *Ode to a Nightingale*. Writing in 1841 of the circumstances under which that masterpiece was composed, he said: "In the spring of 1819 a nightingale had built her nest near my house. Keats felt a tranquil and continual joy in her song . . ." William Swainson, who published on *The Folklore . . . of British Birds* (1886), himself referred to the bird as "her" and "she" and relates English, French, and German lore in which the nightingale is treated as feminine.

The *Greek Anthology*, representing a period of a thousand years, about equally divided B.C. and A.D., also supports this tradition. An anonymous poet among its authors, in translation, says:

"Leaf-loving nightingales, loquacious sex,
Sleep quietly, I beg, and cease your din."

And in the Grecian mythology, Philomela, whose tongue was plucked out so that she could not report a seduction, was changed by the gods into a nightingale that she might forever lament her sorrow. Thus Philomela, although feminine, became an alternate name for the songster.

The reason that the singing nightingale was called a female is thus clearly traditional and of ancient lineage. It seems likely that a similar explanation can properly be invoked with respect to other birds mentioned in this sketch. The medium for tracing the usage is grammatical gender, an infliction from which modern English is almost free, although we do say "she" for boats in general, even a "man-of-war"—"Ay tear her tattered ensign down!" (*Old Ironsides*, Oliver Wendell Holmes.) But old English (or Anglo-Saxon) had grammatical gender, as do most of the continental languages to this day.

Of the thirteen names of birds here considered, eight (lark, nightingale, sparrow, starling, swallow, throstle, thrush, and turtle) were represented in old English, and all but one (sparrow) were feminine. Of the remaining five words, three (dove, mavis, quail) are feminine, and two (cuckoo, linnet) masculine, in their ancestral languages.

It seems reasonable to conclude that grammatical gender had much to do with the literary attribution of femininity to singing birds. And that gender arose through the mysterious ways of folklore in centuries of linguistic evolution. While old English has it, and modern English almost entirely lacks such gender, it must be supposed that the usage faded out gradually. Naturally, it found most expression in earlier times and in poetry, so much of the language of which is figurative.

There appear to be few American examples of the usage. In 1906, Madison Cawein wrote, in *Nature Notes and Impressions*, "Here . . . the wood-dove nests. Far away, mournful in the nooning, I heard her singing." In general, it seems that our authors have kept their bird sexes straight.

RALPH ANDERSON, NATIONAL PARK SERVICE

During the Glacial Age the central part of the Sierra Nevada of California was covered by glacial ice. In the photograph above, Moraine Dome, near Merced Lake, is a spectacular example of mountain glaciation, with its perched boulders, grooves and scratches, and its smoothed and polished rock surfaces.

Relics of the Ice

By PAUL MASON TILDEN

Not many months ago a crew of workmen was busily engaged in making a road cut through a hill—highways go through, instead of over or around, these days—near the city of Jefferson, in west-central Iowa. A hundred feet or so beneath the surface of the hill, the bulldozers plowed into a veritable underground forest; a collection of water-soaked logs, stumps and still upright boles that had at one time been part of a stand of fir trees.

Not much more than a hundred years ago, a discovery like this would have been the subject of much debate—harsh and bitter debate, more than likely, in which science, religion and plain speculation would have been hopelessly entangled. Some would have seen these relics as further evidence of the Flood of Biblical days. To others, the sodden logs would have confirmed a belief that, at some time in the distant past, there had been an immense outpouring of water from the earth's polar regions, and that the trees had been buried in the silt and rubbish of a maelstrom.

Today we know that these fir trees were buried under the debris of a great sheet of ice that, moving south into the United States from centers of snow accumulation in the Canadian Arctic, reached the latitude of Long Island and the Ohio and Missouri River valleys; while at the same time huge separate glaciers covered high lands and mountain ranges like the Yellowstone Plateau, the Rockies, and California's Sierra Nevada. The glaciologists—specialists in the study of ice masses and their movements—also think that, within the past million years or so there have been not one, but a number of such icy visitations.

All through the glaciated parts of our country you can see the mementoes left by the ice. In mountain areas, where there was exposed rock on which to work, sand and rock fragments frozen into the bottom of the moving ice ground, gouged, scratched and polished. Great masses of stone, torn from rocky upthrusts, moved along with the ice, to become the wanderers now called "erratics." In valleys and on flat lands the rock-rubbish

Like a great sheet of sandpaper the continental ice, using sand, gravel, rock fragments and great pressure as abrasives, smoothed and rounded the contours of mountain ranges. The broad, U-shaped saddle or trough seen near the center of this photograph is a familiar sight in the heavily glaciated mountain areas of New England and New York State, and may contain a small mountain pond or bog.

that was carried along and eventually dropped, or which was deposited by torrents from the melting ice, now lies heaped in mounds, ridges and hills.

There is no reason, today, to doubt the accuracy of the ice-picture drawn for us by the glaciologists, a picture whose minute details have been traced out with painstaking accuracy. We see Canada and the northern United States submerged under a dreary, featureless sea of ice and snow that measured, in some places, more than a mile in thickness.

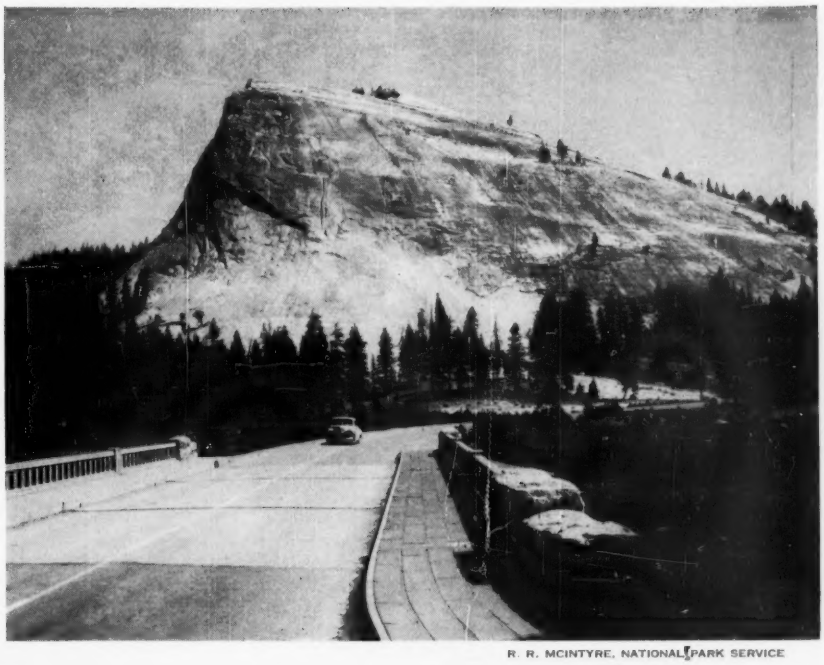
But what special conditions caused these intervals of ice? We know that the climate must have been colder and wetter than it is today. It was a climate that produced, in simple terms, more snow than the sun could melt. The combined efforts of many branches of science have never revealed the secret behind those "special conditions," however, and they are as much of a mystery today as they were in the youth of glaciology, a hundred years or more ago!

Among the debris picked up and carried along by the ice were masses of rock that were often transported many miles. Such wanderers, known to geologists as "erratics," are rather common in the glaciated north; the boulder shown above sits like a monarch in a quiet New Hampshire pasture.

OHIO HISTORICAL SOCIETY PHOTOGRAPH

One of the nation's most remarkable exhibits of glacial sculpturing of bedrock is on Kelleys Island, just off the Ohio shore in Lake Erie. Here the ice, operating on a horizontal surface of soft limestone, cut deep, fluted grooves that were remarkably well preserved by the overlying till in what is now Kelleys Island State Memorial.

Lembert Dome, in Yosemite National Park, is a remarkable example of the unsymmetrical, ice-sculptured bosses of rock known among geologists as *roches moutonnees*, which have a gentle slope on "upstream" sides and a steeper pitch on their lee sides. A series of such sculptured bosses have been likened to so many sheep standing together, and hence the name; although it has also been suggested that the term was derived from a fancied resemblance to so many wigs slicked down with button tallow.



R. R. MCINTYRE, NATIONAL PARK SERVICE

W. C. ALDEN, U.S. GEOLOGICAL SURVEY

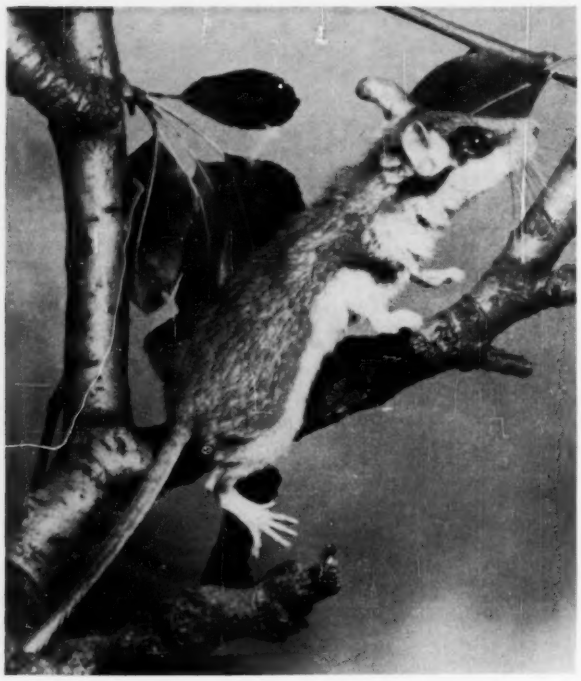
Glacial till—the geologist's general term for the sediments deposited by the ice—sometimes yields the relics of forests that were overridden by the glacier. This branching log and other pieces of wood were uncovered beneath glacial till in a railroad cut near Delmar Junction, Iowa.

PHOTOGRAPH BY THE AUTHOR

Glacial till may consist of extremely fine deposits like those in the photograph at the left, or may be as coarse as the glacial rock-dump shown above, photographed in Acadia National Park, which is mostly cobblestones.

W. C. ALDEN, U.S. GEOLOGICAL SURVEY

One of the remarkable souvenirs of the continental ice is the "esker," a long, sinuous ridge that may extend across-country for many miles. Glaciologists think that these snake-like hills, usually found in relatively flat-lying areas, may have been formed as deposits of glacial streams meandering along at the bottom of the ice sheet. The esker shown at the right is in Menominee County, Mich.



Of Mice— and Dormice

By LISELOTTE DORFMÜLLER

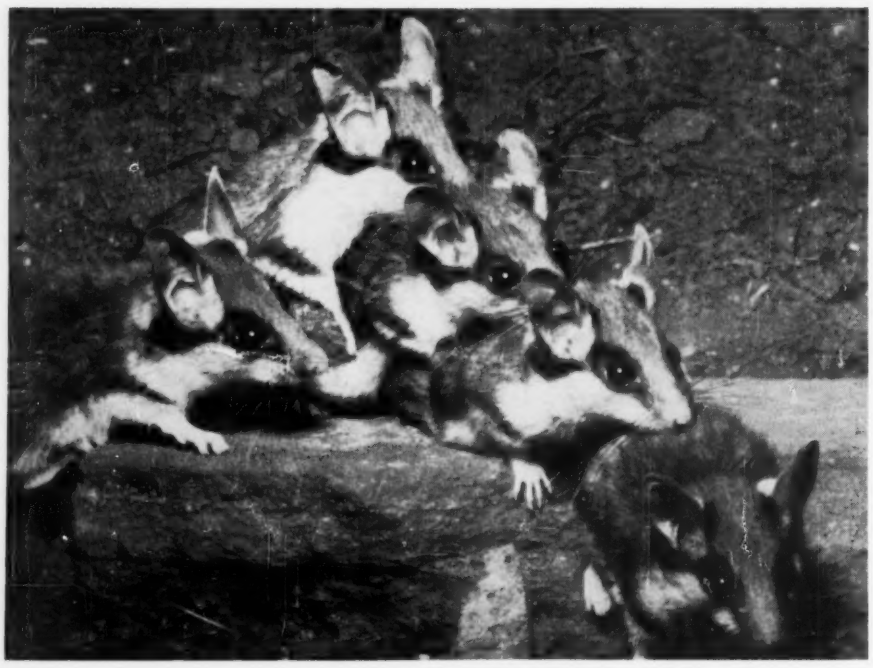
Photographs by the Author

"Don't I see something to eat up there?" A young and agile garden dormouse, *Eliomys*, sets out in search of a tasty insect.

THE MEMBERS of the mouse family occupy, as a rule, a rather unenviable position in the world of the animate. To most humans, mice are nothing but a nuisance, something the tidy housewife wants to be rid of as soon as possible. Among the lesser predators, mice make an important and welcome addition to the daily diets of many.

All in all, the lives of mice might be compared to those of some of our experimental rockets; they are likely to be swift but quite brief. To satisfy an ample appetite, mice must scurry around during their waking hours, keeping, at the same time, alert to avoid the clutches of those that would gladly include "mouse" on the daily bill-of-fare. Thus are numbers controlled and balances maintained.

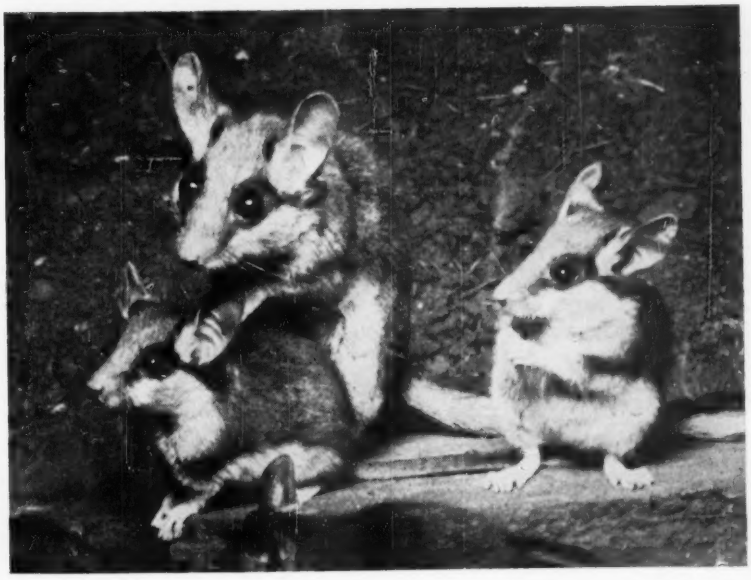
Of course, there are various kinds of mice; more, really, than many folks realize. When the housewife thinks of a mouse, she is probably thinking of the house mouse. But there are also harvest mice, white-footed mice, grasshopper mice, and many others—including the dormice, little natives of the Old World, three species of which are pictured on this and the following pages.



Five young garden dormice exhibit that feeling of "togetherness" that we all hear so much about these days.

The adult garden dormouse measures about four and a half inches long, with another four inches of tail, which bears a tuft of fur at its end. Large ears, dark markings about the eyes, and a coat of gray fur above with white below are the distinguishing marks of the garden dormouse, *Eliomys quercinus*.

Pears are interesting, but not particulary desirable as a food item. The garden dormouse is almost entirely a carnivorous mammal, much preferring insects to fruit.



Mother garden dormouse appears to take charge of the youngsters. Her nest may be constructed in a convenient tree, in a bush, or simply on the ground, and the members of her species may be found from Belgium east to Baltic Russia and south to Bulgaria.

One of the common small mammals of western Europe is the hazel dormouse, usually known simply as "the dormouse." Some three inches long, and with a three-inch tail, the hazel dormouse is distinguished by its large, coal-black eyes, and soft, silky fur that is a rich brown above and pale buff or white beneath. The hazel dormouse is a bush-dweller of Europe, and is among the mammals that hibernate during the cold months. As might be supposed, one of its favorite food items is the hazelnut, which the mammal can empty through one small hole bored through the side of a nut. *Muscardinus avellanarius*, the hazel dormouse, is at home from Scandinavia to England and south to northern Italy.

Largest of all the dormice is the European, or common dormouse, which, with its bushy tail and similar size, much resembles a red squirrel. Its soft fur is gray above and white below, and the mammal sports a set of "spectacles" around its eyes—rings of darker-colored fur. *Glis glis*, the common dormouse, ranges from northern Germany south to Spain, Italy and Greece.

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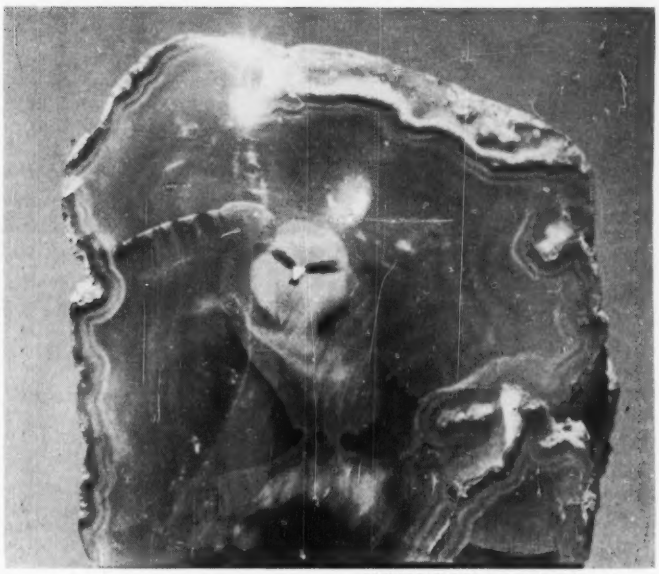


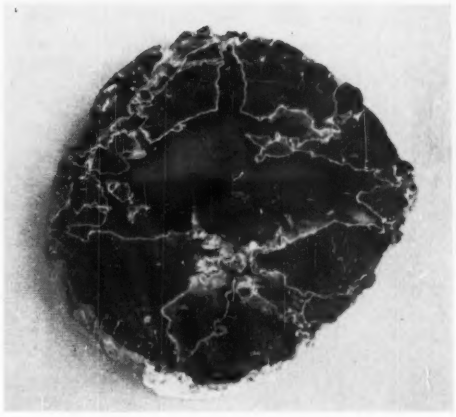
A certain amount of imagination is necessary in creating pictures from some of the solid geodes called "nodules," but the famous "Owl Nodule," owned by Mr. T. B. Williams, of Lordsburg, New Mexico, speaks for itself most eloquently. The most common filling material for such nodules is the variety of cryptocrystalline quartz known as agate.

PHOTOGRAPHS BY MOULTON B. SMITH

In the "nuggets" called nodules, you can often see

Pictures in Stone

By IDA SMITH



One of the nodules in the collection of the author is entitled *Red Sails in the Sunset,* the ship being a red speck on the "horizon."

SOME of the most fascinating work of Nature is performed in the small laboratories that are called geodes and nodules. Geodes are the hollow stone formations whose interiors are sometimes adorned with fantastic arrays of crystals. Nodules are those that are solidly filled, most often with the variety of quartz called agate. Many of the nodules contain "pictures" of various kinds, clearly seen when one uses imagination.

One of our own nodules frames a picture that resembles a ship at sea. The "ship" is a red speck on the horizon, and we call it "Red Sails in the Sunset." Others are "Sitting Duck," "Star and Crescent," and "Autumn Leaf."

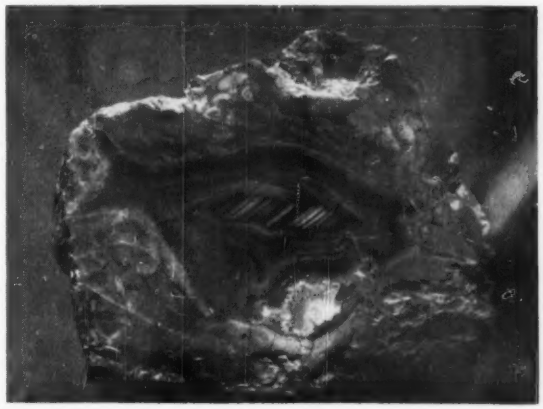
The most spectacular nodule we have ever seen is the famous "Owl Nodule," owned by T. B. Williams of Lordsburg, New Mexico.

Mr. Williams says: "The Spanish miner who dug it out needed no help from his imagination nor the English language, which he could not speak. He came running to me, flapping his fingers in imitation of wings, and calling: 'Whoo! Whoo!' "

Mr. Williams has a standing offer of one thousand dollars to anyone who can prove that Nature has in any way been tampered with. We examined the owl nodule carefully with a ten-power glass, and could find no evidence that it was formed by any other than natural processes, even to the curious beak and eyes.

According to generally accepted theories, geodes and nodules were formed by mineralized waters percolating into cavities in rocks. As the waters evaporated, either

Another interesting nodule in the collection of T. B. Williams, of Lordsburg, New Mexico, is the "fish"—with an unusual, ornate center—in the photograph below.



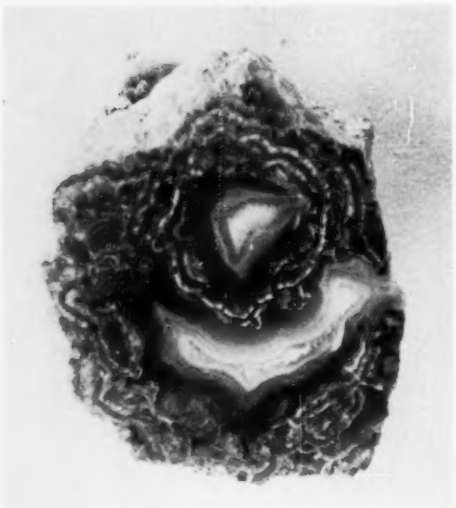
The geode, which is a stone formation with an unfilled center cavity, is often lined inside with small quartz crystals, as in the above specimen. More rarely the interior lining may be a mixture of quartz, dolomite, calcite, and other mineral crystals.

crystals or other solid matter formed, depending upon materials and conditions. Many of these cavities were caused by gas bubbles in hot lava. When the lava cooled, the gas escaped through pores or fissures, and through the pores and fissures the mineralized waters later dripped in. Eventually the materials in the cavities hardened and weathered out of the lava. Indians of the Northwest called these curiosities eggs of the mythical thunderbird, or thundereggs.

Many curious formations are found in geodes and nodules; quartz, calcite, and azurite crystals, zeolite formations, agate, and others.

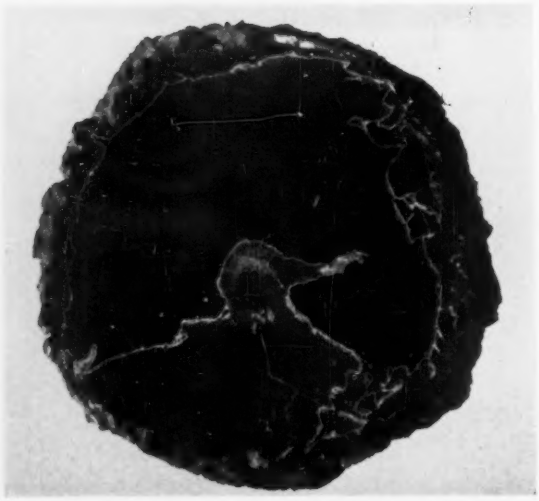
A friend has a nodule that is filled with bluish agate. In the center, just under the surface, lies a quartz-crystal flower. The nodule resembles a tiny pool with a water lily. When our friend sawed the nodule in half, he was lucky enough to have sawed in the right place; otherwise the flower would have been spoiled.

Pictures in nodules are, of course, purely a matter of chance, a case of the mineralized liquids following the course of least resistance. The crystals of geodes form according to geometrical laws, by which atoms line themselves up in definite, orderly patterns. However, most folks are not particularly interested in the more technical aspects of geodes and nodules; they prefer to see them as thundereggs, laid by the thunderbird!



An apparent combination of two nodules gives rise to a picture that might be entitled the "Star and Crescent." ←

The "pictures" in nodules, like the "Autumn Leaf" above, are purely accidental, and appear to be a case of mineralized liquids following the lines of least resistance.



This nodule is entitled "The Sitting Duck," although the Indians of the American Northwest would doubtless have contended that it was a miniature replica of the mythical "thunderbird." The eggs of the thunderbird were nodules, according to legend, and nodules are still known, particularly in the Northwest, as "thundereggs."

Magazines Merge

The statement below was issued jointly on November 20, 1959, by the officers of the American Nature Association and the Trustees of the American Museum of Natural History.

THE forthcoming consolidation of the two distinguished magazines, *Natural History*, published by the American Museum of Natural History in New York, and *Nature Magazine*, published in Washington by the American Nature Association, has been announced jointly by the Trustees of the Museum and the Officers of the Association.

As a result, a wider reading public will enjoy the popular features of both publications in a single and considerably larger magazine at no increase in the five dollar annual subscription price that has been charged for each.

The new magazine will be under the direction of John Purcell, Editor of *Natural History*, and will be published in New York. Richard W. Westwood, President of the American Nature Association and Editor of *Nature Magazine*, will serve as contributing editor, reporting on developments in the field of conservation as viewed from the nation's capital. Paul Mason Tilden, Assistant Editor of *Nature Magazine*, will be an Associate Editor of the combined publication. In addition, several of the departmental editors of *Nature Magazine* will continue to present feature columns at regular intervals.

For thirty-six years and sixty years respectively, *Nature Magazine* and *Natural History* have reported to their readers information in the field of the natural sciences which has not been readily available elsewhere in periodicals. Among the outstanding features that readers of *Nature Magazine* will be happy to see continued and that readers of *Natural History* will welcome with enthusiasm are the educational inserts by Dr. E. Laurence Palmer, published bi-monthly by *Nature Magazine* for the past twenty years, and which have become invaluable teaching aids for science teachers. Other columns that will continue to appear at regular intervals are the Nature Camera, edited by Mrs. Edna Hoffman Evans, Nature in Rock and Mineral by Paul Mason Tilden, and Nature and the Microscope by Dr. Julian D. Corrington. The responsibility for Sky Reporter, a feature incorporated into *Natural History* in June, 1958, will be assumed by Simone Daro Gossner, an astronomer with the United States Naval Observatory and astronomy editor of *Nature Magazine* for the past five years.

The combined publication will average between sixty-four and seventy-two pages—a considerable increase over the size of either magazine in the past. The American Museum of Natural History and the American Nature Association look forward to the consolidation as a means of making still more effective the educational task to which each is dedicated.

"Certainly the combined publication will afford a wider opportunity for public service in the field of nature and science education," declared Arthur N. Pack of Tucson, Arizona, President emeritus of the American Nature Association and its co-founder with his father, the late Charles Lathrop Pack.

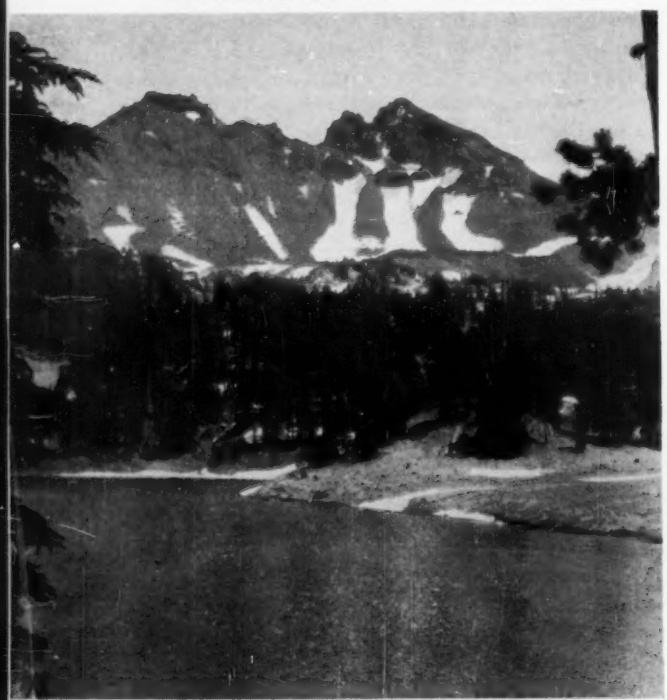
Speaking on behalf of the Board of Trustees of the American Museum, Alexander M. White, Museum President, stated, "We are delighted about this new venture and we are sure the readers of both publications will be equally pleased."

To the above statement of fact the editor would like to exercise his editorial prerogatives and add his personal thanks to the many readers of this magazine who have, through the years, responded so faithfully in support of constructive programs in conservation and Nature education. It has been a privilege to come to know so many of these reader-friends, some personally and many through correspondence. The editor would also like to thank the many fine contributors to the pages of the magazine who have been reasonably content with the necessarily modest rates of payment for their prose, poetry and pictures. The combined magazines will reach a larger audience and merge the interests and influence of both publications. R.W.W.

Beautiful Scott Lake nestles in the meadows and pine forests of the west base of the Three Sisters, in Oregon's Cascade Range. The North Sister, at left, is a remnant of a shattered prehistoric volcano known as Mount Multnomah.

Oregon's Three Violent Sisters

Broken Top, below, is a part of the rocky rim left after the catastrophic demise of Mount Multnomah.



Is GEOLOGY a "dry" subject? Certainly not. Take mountains, for example. Their life stories actually can be livelier, more dramatic and unpredictable than those of human beings. To prove it, all we have to do is to substitute *our* time for geological time. This can be done legitimately, for time is relative, and may be drawn out or telescoped without violating the essential truth of a series of events.

So let us imagine a half-hour color television show on the lives of the Three Sisters. No mountains have had a more varied and exciting past, and condensing a million years into a few seconds produces a gripping drama with all the action, suspense and conflict of a top-rating Western or "whodunit." This is the kind of thing that the Walt Disney Studios could create with flair and distinction. But there should be no breaks for commercials. Human endeavors appear puny compared with the earth-building struggles and titanic forces unleashed in this geological spectacular.

The Three Sisters, heroines of the piece, are a trio of snow-capped dormant volcanoes that rise from the broad, mile-high back of Oregon's Cascade Range, midway between the California and Washington lines. More than 10,000 feet in elevation, they are part of the impressive chain of ancient fire mountains that stretches for 650 miles along the axis of the Cascades from Lassen Peak to Mount Baker, which includes the famed Shasta, Hood and Rainier. Any one of these would make a

worthy television subject, but the Three Sisters have a secret hidden in their past so big and startling that they are preeminent as story material. In geology, as in soap operas, mystery heightens the drama, and the quiet, innocent appearance of the Three Sisters belies their tumultuous background.

At the start we should give screen credits. Nature, of course, was the producer, director, set designer and creator of sound effects. But the scenario was written by Dr. Edwin T. Hodge. He it was who first delved into the lives of the Three Sisters, discovered their amazing secret, and told their story. Dr. Hodge was Professor of Economic Geology at the University of Oregon, and in the summer of 1924 did extensive field work in the area. His detailed studies revealed that the three mountains rest upon the worn remnants of Oregon's greatest prehistoric peak, which he called Mount Multnomah. This gigantic volcano once rose a mile higher than the present summits of the trio, but its entire top was blown away in a cataclysmic explosion that left one of the largest calderas—or crater-like basins—in the world. So the Three Sisters were born of violence

By WELDON F. HEALD

Photographs by the Author unless otherwise credited.

and destruction, and it is such earth-shaking events that make their story so fascinating.

. Other geologists came after Dr. Hodge and some doubt that he fully proved the case for Mount Multnomah. But we like his script. Dissenters are free to state their own versions on another network.

The show begins in the Cretaceous Period, more than sixty million years ago. Our position is a point in the sky high above the Pacific, off the present coast of Oregon, and overlooking the birthplace of the Three Sisters. At the start, however, there is nothing below us but a wide stretch of blue water extending eastward 350 miles to newly formed land in Idaho. But rising from the sea to the northeast is a group of islands—the Isles of Shoshone—ancestors of Oregon's Blue and Wallowa Mountains. With the all-seeing eye of television, we skim the water's surface and sweep the land areas for closeup views. It is near the end of the Age of Reptiles, and small furry mammals are emerging to take over earthly dominance. However, giant marine lizards, forty feet long, still swim the ocean below us; huge flying reptiles, with wingspreads up to eighteen feet, flap by; while on land grotesque, lumbering monsters, weighing many tons, crash through the lush vegetation of a moist tropical climate.

The scene shifts back to our high-perched viewpoint, and we watch a revolutionary change take place with the coming of the Eocene epoch, the dawn of a new period called the Tertiary. The Shoshone Islands merge and heave up into high hills. From their southwest shore a strip of ocean becomes a lighter blue, then almost brown, and suddenly land breaks the water's surface. This grows and spreads across the foreground until it stretches down through "Oregon" into "California." Behind it, to the east, is left imprisoned an inland sea that extends to the foot of the Rockies, now buckled and bowed into a towering range, 15,000 to 20,000 feet high.

But the powerful orogenic, or mountain-building, forces within the earth have not spent themselves, and there is restless movement everywhere. Watching such movements, we can understand what Charles Darwin meant when he wrote: "Nothing, not even the wind that blows, is so unstable as the level crust of the earth." The land now continues to rise and sheds the water like a submarine coming to the surface. The former expanse of blue is gradually replaced by flat, green plains, dotted with large freshwater lakes, while the region around the future Three Sisters is rolling country, crossed by broad, winding rivers.

But all that we saw happen in a few minutes actually took fifteen to twenty million years to accomplish! So when the scene fades for another closeup, we find a different world. The dinosaurs have completely disappeared and in their place are the ancestors of modern mammals. Perhaps the most interesting is the graceful little *eohippus*, or dawn horse, not more than a foot high.

OREGON STATE HIGHWAY DEPARTMENT PHOTOGRAPH

Lava fields around Mt. Washington, just north of the Three Sisters, are almost as fresh as when laid down centuries ago.

Today, aside from being an outdoor museum of volcanic activity, ancient and recent, the Three Sisters country is a magnificent summer recreation area of rushing streams, forests, lakes and alpine meadows.

Dominating the sea are sharks, fifty to seventy feet long. The climate is damp and semitropical in the lowlands, with avocados, figs, cinnamons and persimmons abundant, while redwoods and deciduous trees thrive at higher elevations.

During the following Oligocene epoch, we look down and watch the tortured and heaving earth begin to crack with the strain. As innumerable hair-line fissures open, smoke billows upward, clouds of ash and cinders are blown out, and hot, liquid lava pours forth, spreading over the land in all directions. At times the entire inland basin appears to be a seething inferno as the sheets of lava accumulate and overlap each other. For millions of years, through the Oligocene and Miocene, the flows continue and eventually bury eastern Oregon and parts of Washington and Idaho under 300,000 square miles of dark, basaltic lava rock, in places more than a mile deep. In fact, we have been witnessing the creation of one of the three largest lava fields in the world. However, the eruptions never affect the whole area at one time, and during quiescent spells the desolate black lava becomes fertile soil, supporting rich, green vegetation. Closeup shots show forests of gigantic sequoias, palms, magnolias and ginkos, inhabited by rhinoceroses, saber-toothed tigers, giant sloths, and diminutive camels. Drowned by floods and killed by ash, remains of this profuse Miocene animal and plant life have been preserved in the famous John Day fossil beds of eastern Oregon.

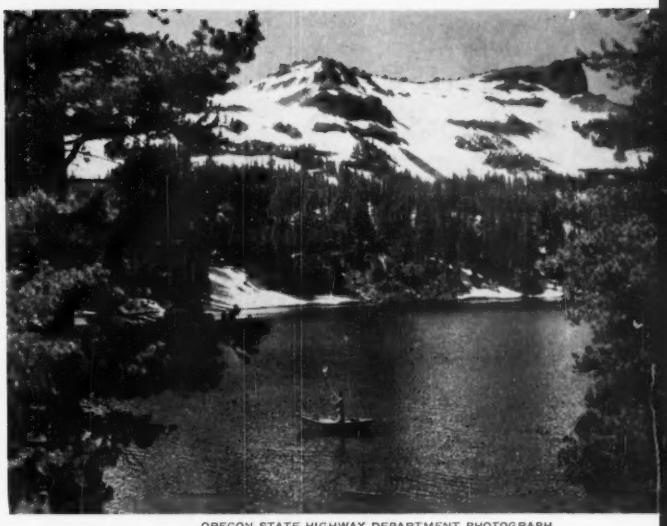
Meanwhile, in the foreground, a sharp slippage of several hundred feet occurs in an almost straight line, bordering the coast. This north-south fault is on the site of the future Cascade Range, and possibly is the cause of its construction. Volcanoes begin to erupt along the break, and their explosive ejection of material and spewing lava flows build up cones around the vents. By far the largest of these smoke-plumed mountains is in the center, just below us. Its growth is spectacular. Eruption follows eruption, and vast streams of molten lava flow down the long slopes, reaching distances of sixty to seventy miles from the crater. With each outpouring of ashes and lava, we see the cone grow in bulk and height—10,000 feet, 12,000 feet, 14,000 feet, it swells upward—until the massive peak finally soars fully 15,000 feet above the sea. This is Mount Multnomah, the monarch of all the Cascades, past or present.

While the mountain enlarges, another geological revolution is taking place. Almost under us the Coast Range rises out of the ocean, pushing the coastline westward thirty-five miles, and forming the broad Willamette Valley between it and the Cascade fault. At the same time, the Cascades themselves bulge upward into a wide, elevated plateau, and we see the steepened west-slope streams cutting ever-deeper canyons and dissecting the highlands into ridges and valleys. Although heavy forests still clothe the west side, the damp Pacific winds can no longer hurdle the barrier. As a result, the inland plains turn from green to brown, lakes disappear, and eastern Oregon becomes a desert, much as it is today. American geologists call this great mountain-building period the Cascadian Disturbance. However, the effect was almost world-wide, and the birth of the Sierra Nevada, Alps and Himalayas date from that time.

So, at the beginning of the Pliocene epoch, some

The rocky prow on the east slope of the South Sister is the remains of a former volcano on a more easterly site.

When the glaciers of the Ice Age retreated, they left many cliff-walled basins and sparkling, jewel-like lakes. One of these, known as Three Creeks Lake, is a popular trout-fishing center, with campgrounds and boats for hire.



OREGON STATE HIGHWAY DEPARTMENT PHOTOGRAPH

twelve million years ago, we look down upon an Oregon somewhat resembling its appearance today. But center-stage, where the Three Sisters now stand, is the great prehistoric volcano, its upper slopes probably shining with snowfields and possibly even glaciers. Let us watch it closely, for we are about to witness one of the biggest blowouts in which Nature ever indulged.

After a long period of quiescence, a jet of steam issues from the summit. This is followed by a mushroom-shaped cloud billowing miles into the sky, flashing with jagged forks of lightning. The earth shakes and rumbles, and there are jarring detonations like heavy artillery. Withering blasts of incandescent gas sweep down from the crater in quick succession, alternating with explosive volleys of white-hot pumice. Rushing floods descend the canyons from the melting snowcap, and the surrounding forests are consumed in raging fires. Desolation spreads, and every living thing perishes for miles around. As the eruptions increase in violence the whole mountain becomes enveloped in a thick, brownish pall that glows and flickers with an unearthly light.

Suddenly there is an ear-splitting roar and the brown cloud is literally blown outward until it covers hundreds of square miles in a few seconds. Then all is quiet. As the air slowly clears, we look down upon a scene of appalling destruction. Gone is the majestic peak, and in its place is a ragged, gaping, circular hole. The mountain's top 4000 to 5000 feet has been blown off, leaving a ragged, cliff-rimmed, circular hole, nine miles across and fully 4000 feet deep. Something on the order of twenty cubic miles of material was blown out and at least twelve cubic miles collapsed into the great hole. Out of the devastation, however, the North Sister is born, for it is the highest point on the northern rim of the great caldera. But the Middle and South Sisters are still in the womb of the torn Mount Multnomah.

As the steaming cauldron gradually cools, it is filled by a deep lake. Without visible inlet or outlet, its sparkling waters are completely ringed with precipitous cliffs, thousands of feet high. The resemblance to Oregon's present Crater Lake is striking. But this ancient body of water is much larger and more impressive. Little by little, too, the earth's wounds heal, and we see the green of vegetation return and once more clothe the west slope of the Cascades in luxuriant forests.

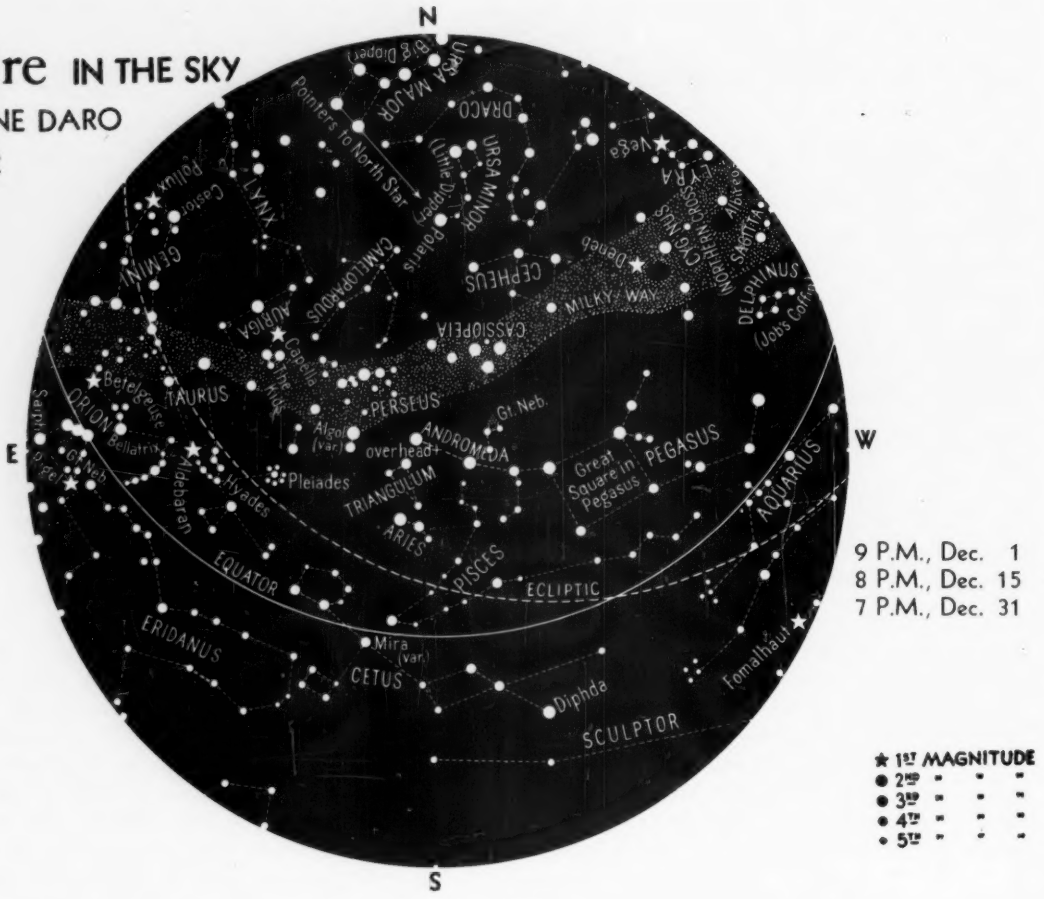
But this is only a slight pause in the ever-continuing pageant of geological forces. Next, the rivers cut back their headwaters to breach the caldera rim. The lake is drained and the circular ring of cliffs is reduced to a few ragged teeth, culminating in the North Sister and the present Broken Top. Nor have the subterranean fires died out, for presently twin columns of smoke rise from the bottom of the caldera. They announce the birth of the North and Middle Sisters, and the next ten million years witness the growth and turbulent life of these new fire-mountains within the shattered ruins of Mount Multnomah. Almost continuous eruptions, accompanied by vast flows of lava, build them up until they reach heights of 11,000 to 12,000 feet. Then craters open on their western slopes and fresh cones arise, wrapping themselves around the worn remnants of the old. This is a time of vigorous volcanism all along the Cascades, and around the Three Sisters are a score of smoking vents. Just north, Mount Washington reaches a height of 8000 feet and later, ten miles southeast, the symmetrical cone of Bachelor Butte pushes up to more than 9000 feet.

Between one and two million years ago the Cascade Plateau once again gains elevation, the climate becomes colder, and we watch one of the most dramatic events in the lives of the Three Sisters—the Ice Age. This is the Pleistocene epoch, a time of world-wide mountain building, when conditions changed so greatly that the Tertiary Period comes to an end and the Quaternary begins. First, patches of snow appear on the higher peaks. These expand and extend lower along the range until they become continuous, glistening snowfields. As they deepen they are compacted into ice and begin to move as glaciers. Joining, coalescing and expanding, ponderous rivers of ice are soon formed, which slowly move down the west-slope valleys like long, white snakes. The largest glaciers reach distances of seventeen to twenty miles from the divide before they come to rest, but on the dryer eastern side the ice front stops before reaching the interior plateau.

Four times the range is buried in snow and the glaciers advance, then retreat back to the heights. As the ice tongues push forward, we see the forests shrink before them, only to return up the mountainsides as they melt. In fact, the interglacial periods are as warm as the present—perhaps even warmer—and at least once the ice disappears entirely. When the (*Continued on page 548*)

Nature IN THE SKY

By SIMONE DARO GOSSNER



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. Times given are for Local Standard Time.

Astronomy as a Career

FOUR YEARS ago, I was returning from Dublin, where I had attended a general assembly of the International Astronomical Union. I had to make an airplane connection at Shannon Airport, and had stopped at the airline counter for the customary ritual of confirming my reservation. The employe who verified my credentials took a long, frowning look at my American passport, had a whispered conversation with a colleague, and finally asked me "Astronomer? Is that a profession in the United States?"

Since the advent of the sputniks, two years later, there can be little doubt left in the public's mind that astronomy is indeed a profession. But the popular concept of an astronomer's life can often be far from reality. The old man with gray beard and skullcap, who spends his nights peering through a telescope in reverent awe of the heavenly spectacle, may remain a symbol of a past age; he would, however, look strangely incongruous in a modern observatory.

The astronomer of today seldom looks through a telescope, anyway. Observations are recorded photographically, or photoelectrically in the case of optical (conventional) telescopes. As for radio telescopes, they do not operate in the visual range, so the question of "looking" does not even arise.

How, then, does a professional astronomer prepare himself for his career? How does he occupy his time? And what are his opportunities?

Astronomy is one of the physical sciences. Its theories and methods of research are firmly rooted in physics and

mathematics. Electronics engineering plays an important part in its gadgetry. Much of its technical literature is written in foreign languages (mostly German, French and Russian, with a sprinkling of others). This does not imply that every astronomer is a physicist, a mathematician and an engineer, but it will be found that he has had a thorough schooling in at least one of these fields, and that he has a good reading knowledge of one or more foreign languages.

An early enthusiasm for stars and constellations, in childhood or as a young teenager, is neither a prerequisite nor a guarantee of success. On the other hand, the high school student with a marked proficiency in mathematics and physics should not overlook the possibilities of a career in astronomy. If he is undecided, he may go on to a physics or mathematics major in college, with perhaps a minor in astronomy. This would not handicap him at all, should he decide later to do his graduate work in astronomy. Language courses should not be neglected; a reading knowledge of two foreign tongues is required for most advanced degrees.

Depending on his personal preference and aptitude, the professional will specialize in practical or theoretical work. As a practical astronomer, he will probably secure his own observations by means of a relatively large instrument—the size of the telescope varying of course with the institution to which he belongs—or he will supervise the technical assistants entrusted with the observing task. In either case, it will be his responsibility to analyze and interpret the results of observation.

As a theoretician, he will expand existing theories or develop new ones in the fields of celestial mechanics (motions of heavenly bodies), astrophysics (behavior of matter inside the stars and in their atmospheres), cosmology (structure and development of the universe) and other related subjects. Needless to say, the distinction between theoretical and practical work is not always as clear-cut as this, and duties may overlap. Furthermore, someone holding an academic post, at a college or university, will be expected to do a specified amount of teaching.

An increasing number of astronomers utilize modern high-speed calculators (IBM, Univac, Burroughs and others). Most of them, at present, are self-taught in the use of these machines, but many colleges are beginning to offer courses in the subject.

The number of professional astronomers is extremely small throughout the world. In this country they number about 650. Of these, about fourteen percent (one in seven) are women. By comparison, American physicists number well in excess of 12,000.

The number of astronomical jobs is comparably small, but exceeds slightly the number of active astronomers, for whom job-hunting is thus often reduced to a matter of choice. Most positions involve research or teaching (or both) at an observatory, a college, or a university. A few Government agencies have astronomers on their staff. Among them, the U. S. Naval Observatory and the Smithsonian Institution probably have the largest number. Industrial openings are extremely scarce, and usually require the special abilities of someone who is already well established in his profession. Work at a planetarium, which is concerned with the presentation of astronomical data to the public, can offer a pleasant alternative to an academic position.

For those who do not have an advanced degree, there are assistantships at various observatories, as well as certain types of Government positions.

A person without professional training in astronomy can often find a job as a computer or as an observing assistant. Good shop technicians are also in demand because, at many observatories, telescopes and special instruments are often designed and constructed on the premises.

Astronomy is basically an academic profession. That is to say that the salaries of professional astronomers are comparable to those of college professors and instructors. In fact, a large proportion of astronomers *are* college professors and instructors. They share the same advantages of tenure and academic freedom. Alas, they share also the same depressed salary scale. To the student in search of a career in the physical sciences I would say: If the size of your future paycheck is your principal concern, be an engineer or a physicist. If, however, you have an inquiring mind, a good scientific background and a taste for life in a collegiate atmosphere, do not overlook the opportunities and rewards of a career in astronomy.

DARK PLANET

Stars move by day as well as night:
On the long coast I see
A crow—a coal-black satellite,
Cruising eternity.

Daniel Smythe

In the month of December, the moon will be full on December 14, and the New Moon will occur on December 29.

The winter solstice, marking the beginning of winter in the northern hemisphere, will occur on December 22, at 9:35 a.m., Eastern Standard Time.

Except for Venus, all planets will be poorly placed for observation in the month of December.

Mercury will be a morning star and will reach its greatest western elongation on December 12. Its magnitude on that date will be –0.2. It will rise one hour before the sun on December 1, one hour and 45 minutes before the sun on December 15, and one hour before the sun on December 31. It will remain very low in the southeastern sky, and will not be favorable for observation.

Venus will be a brilliant morning star, rising at approximately three and one-half hours before the sun during the entire month of December. Its brightness will decrease somewhat from magnitude –3.9 on December 1 to –3.6 on December 31.

Mars will be low in the south- (*Continued on page 545*)

Nature IN THE SCHOOL

By E. LAURENCE PALMER

Professor Emeritus of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

A Progress Report

In 1924, August Dvorak presented his *General Science Scales*, published by The Public School Publishing Company of Bloomington, Illinois, as his doctorate thesis at the University of Minnesota. It was based on material developed by Dvorak, and supplemented by material from S. R. Powers and Earl Glenn. I knew none of these men but I read the *Scales* and they seemed so inadequate that, for the fun of it, I dashed off a set of puzzles that I thought might be more effective measures of ability to work in science. I presented these to a faculty group at Cornell and was encouraged to develop them further.

At the meeting of the American Association for the Advancement of Science, in an aside, I showed them to Arthur Newton Pack, who had recently started *Nature Magazine*. He took me to the magazine headquarters, introduced me to the staff and showed them my "puzzles," which I had not and still do not take seriously. They asked that I prepare them for publication in *Nature Magazine*. I did so, and in the March, 1925, issue appeared my first article in this periodical. From that time until the present I have hardly, if ever, missed having an article in the magazine.

Tests questionable

I did not think that the quality of the Dvorak effort justified its being taken seriously by anyone. Apparently Francis Curtis, then a graduate student at Columbia and for many years leading Science Educator at Michigan, took the Dvorak tests sufficiently seriously to use them as the basis for the data in his doctorate thesis. As late as March 22, 1958, we find that thesis held in high esteem by a committee of the National Association for Research in Science Teaching, in spite of all I have written and said about it in the meantime. To my knowledge the first time my views on the subject struck sparks was when, about 1929, the Dean of the School of Education of Minnesota asked me what I thought of the Dvorak tests, of which he obviously was very proud.

Much to the embarrassment of some of my associates I answered his question frankly. I had been made a full professor at Cornell, and had twice turned down an associate professorship at Columbia, but I learned that there are problems associated with questioning the judgment of a dean. Last month I showed this very test to a professor of education at the University of Minnesota and he told me that if such an effort came across his desk at this time it would go directly into the waste basket. I think we have made some progress. Here is some more evidence.

So far as I was concerned, from 1924 to 1929 the Dvorak tests might just as well have been in that waste basket. Then, in January, 1929, Harry Cunningham published in the *General Science Quarterly* a list of tests in general science of which he approved. I questioned others in the science education field and was amazed to find that most of them saw nothing to get worried about in the Dvorak tests. In 1932 the *Thirty-first Yearbook* of the National Society for the Study of Education appeared. It reported as valid studies based on the soundness of the Dvorak test. I hit the ceiling.

The other side

The yearbook was the responsibility of Powers, Curtis, Downing, Pieper, Craig, Watkins, Billig, Heathershaw, Meister and Noll, at the time "the big shots" in science education. But in my judgment that did not necessarily make it a sound guide to good science teaching. There were those who differed with me, and most of them have, ever since. On pages 183-198 of the March, 1948, *School Science and Mathematics* and on pages 473-480 of the November, 1957, *Nature Magazine*, I gave my side of the story. It cannot be repeated here, although I wish my critics could read the earlier article suggested above—after they have re-read this test.

The October, 1959, issue of *School Science and Mathematics* publishes the vice-presidential address to Section Q of the American Association for the Advancement of Science. It was written by Dr. Cunningham, who wrote the article in 1929 and which had awakened me to the fact that some people, at least, could read the Dvorak test and see nothing questionable about it. For thirty years I have been trying to change this situation, and for thirty years the teaching of science has been deteriorating, at least below the college level, in many respects. Since sputnik we have been conscious of the need of a great change in a situation that was created, in a large part at least, by those who could not or would not admit that there was anything wrong in studies based on a test that, in 1924, was acclaimed as being so valuable and reliable. It is my belief that so long as it, and those who have approved it, are not examined critically and judged by their stand we can make no progress in this field.

There is hope

This latest report by Cunningham, quoted above, gives me hope that there are a few who wonder if the science educators who have defined science in their own way have not been "taking some of us for a ride." Now Cunningham openly admits that criticism is centering on "the scientific educators." He questions the emphasis on teaching the scientific method "as an objective." He does not go along with the Powers-Craig philosophy, which supports the organization of a science course based on large generalizations and therefore emphasis on deductive rather than inductive thinking. He even points out that through history whenever emphasis on deductive methods have prevailed dictatorships have developed. This is rank heresy. This, in my judgment, gives me some hope that real progress may be just around the corner, at least. I admit that there is some contradictory evidence, but at least I breathe a little easier than I have in more than thirty years. Once the sun gets in and the ice breaks anything can happen. All I have ever asked is that the truth be sought, and, when found,

accepted and accepted, pushed and put into practice.

I cannot help but be a little amused when Cunningham calls me a member of the "old guard," and puts down as "young upstarts" Downing, who was twenty years older than I; Powers, who was a year older than I; Curtis, who is three weeks younger than I. I forgive him because his report provides evidence that we are beginning to get somewhere after more than three decades that I have been writing for *Nature Magazine* and during which the magazine has been backing me.

As for me, I am glad that the Dvorak test was published. It provides what, for me, is a good test of the direction one takes in his science education philosophy. If one accepts it, and the studies based on it, as valid, it seems to me that one favors the so-called "science" that produced the pre-sputnik mess, which gave us a serious crisis. You, of course, can go in whatever direction you please, but I think that there is evidence that we are making progress is revolting against the dictatorship of the Dvorak era.

Astronomy

(*Continued from page 543*)

eastern sky at sunrise, and will be very difficult to observe. It will rise 45 minutes before the sun on December 1, one hour on December 15, and one and one-half hours on December 31.

Jupiter, in Ophiuchus, will be in conjunction with the sun on December 5, when it will enter the morning sky. By December 31, it will rise one and one-half hours before the sun, but even on that date it will be low in the southeast and difficult to see.

Saturn, in Sagittarius, will be in conjunction with the sun on December 31. It will be too low in the southwest to be seen well at the beginning of December, and will be lost in twilight by the middle of that month.

A few Ursid meteors may be seen on December 22, but the shower is expected to be weak this year.

Report on the Galapagos

A publication that should prove of great interest to many readers of *Nature Magazine* was released not long ago by the Columbia University Press, 2960 Broadway, New York 27, New York. This was a 32-page, large-format brochure entitled *Survey of the Galapagos Islands*, written by Dr. Irenäus Eibl-Eibesfeldt, of Germany's Max Planck Institute, and available from the publisher for seventy-five cents. Richly illustrated with black-and-white photographs of Galapagos Islands wildlife by the author and others, the brochure lists and discusses the many remarkable—and historically distinguished—species found on this seemingly barren volcanic archipelago some 600 miles off the coast of Ecuador. Since the publication of this work, the Galapagos have been declared a national park and wildlife refuge by the government of Ecuador, in the hope that the unique fauna found there may be preserved for the future.

Science Teachers

Teachers of science and conservation in elementary, junior and senior high schools are cordially invited to attend the sessions of the science teaching societies in Chicago, December 27 to 30. These meetings will be held jointly with the sessions of the American Association for the Advancement of Science.

Headquarters of the American Nature Study Society, the National Science Teachers Association, the National Association of Biology Teachers, the National Association for Research in Science Teaching and the Central Association of Science and Mathematics Teachers will be at the Sherman Hotel. Separate and joint sessions of the several organizations will be held.

The program includes discussions of outer space, elementary science teaching, research, natural history of the Chicago area, future scientists, streamlining biology and many other related topics. There will be a field trip to the Morton Arboretum at Lisle, Illinois. Muriel Beuschlein, Chicago Teachers College, Chicago 21, Ill., is general chairman.

"The School Story"

The National Education Association, in company with 50 affiliated state education associations, has entered the television field with a new, 13-week series of half-hour films entitled "The School Story." According to William G. Carr, executive secretary of NEA, this expansion of the Association's public service television programming marks the first time that a national non-commercial television series has been "built around the problems, aims, and achievements of education in this country."

"The School Story" will be available to television stations in 261 major TV markets during the 1959-60 school year. Viewers of the series will see many important issues in education explored—from how first-graders learn reading skills to the curriculum program of a comprehensive high school to the missile laboratories of a great university.

Letters to the Editor

Mill Valley, California

Sir:

Do bats always sleep in a dark place? Perhaps not. On a warm day in mid-April, a little north of Detroit, at four o'clock in the afternoon, we found one dangling from the radio antenna wire over the porch. At first, we thought it was a dead leaf that had caught on the wire, which the wind was quite roughly blowing about. On second glance, the wings were easy to see, and stepping up under it, we could see the little fellow raising his head, and turning it so he could watch us!

The little brown bat is the common one here. We used to have one living in the attic, until some repair work closed the entrance hole under the eaves. We often saw it flying, but never hanging on anything. We do not know how long the bat was there that day, but toward dusk, when we looked again, it was gone.

(Mrs.) Margaret G. Griebe
3220 Harrison
Rochester, Mich.

The Editor,
Nature Magazine
Washington, D. C.

Sir:

Quite by accident I discovered an interesting thing when taking close-up pictures of winter buds. The twig of a honey locust had a beautiful thorn, and on close examination I saw two embryo leaf structures toward the end of the thorn.

Going back to the tree where I obtained the twig, I examined dozens of other thorns and could not find a trace of any leaf starts. The same applied to other trees in the area. The only conclusion I could draw was that this particular thorn was a living fossil of a trait long lost by the honey locust, since thorns are modified branches.

Harry E. Schweitzer
R. R. 4
Peoria, Ill.

THE Nature CAMERA

By EDNA HOFFMAN EVANS

Some Final Words

IT IS CHRISTMAS TIME AGAIN, and because this is the last time we will be strolling down the Nature Camera trail together, I cannot help but see some blue tones among the gay red and green holiday trimmings.

Before we do any shopping, I would like to linger a while along the trail and look back—back across the nearly fifteen years that have passed since I became the conductor of this ten-times-a-year jaunt into the realm of photography.

It has been a pleasant task, rewarding to me in many ways. The many contacts by mail resulting from it have been extremely pleasant. Readers have written from many parts of the country, sharing their photographic problems, their knowledge, and their experiences. It is one of my big regrets that in the rush and confusion of this busy world there has not been time to keep all the correspondences going after the immediate questions have been answered or the information given.

I, for one, have learned a great deal about photography over the years. It is one thing to take pictures for one's self; it is an entirely different thing to take pictures with a view to writing about the experience in a way that might be beneficial to others. It makes one much more observant, and perhaps also more critical, of his own activities.

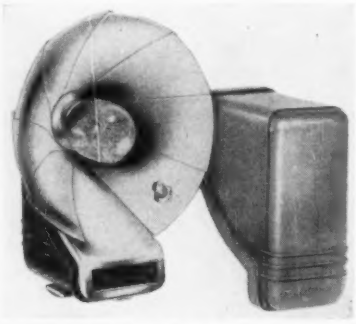
To reminisce in particular, World War II was only recently ended when I began writing the *Nature Camera* section. Most of the photographic supply industry was still geared to wartime production. Film was hard to get. Cameras were scarce and their styles and makes were quite limited.

The "old reliable"

In those days I used a big, clumsy (but highly dependable) 4 x 5 Graflex camera, and black-and-white film exclusively. Color film had been available before the war, but its use by amateurs was not widespread. Flash bulbs were developed a decade before the war, but they were used mainly by news and other professional photographers.

The 35mm camera, too, was on the market before the war — the first Argus model (I still have one) came out about 1937 or 1938, and there were Leicas for those who could afford them. In the 1930's we looked to Germany for the best lenses and cameras, and we were inclined to feel that American-made photo equipment was not in the same class as the imported models.

During the war many of the men and women in the armed services received training in photography. That knowledge stayed with them when they returned to civilian life, and I think it may have been one of the factors that brought about the big increase in amateur photography after the war. Some of the ex-army and navy photographers opened camera stores of their own. Some became professional photographers. Others retained an interest in cameras and picture-taking, and they shared it with their friends and families as the years passed.



This Graflash M Fan-Fold flash unit is smaller than a package of cigarettes, yet it does the same job as a much larger unit. It is another new product of Graflex, Inc.

There was not much civilian picture-taking during the war. As I said before, film was scarce and the ordinary civilian had to know the "right" person in a camera store in order to get any photographic supplies at all.

Those days, when the war clouds hung black and close, seem far away, now. Let us hope and pray that they never gather so close again.

After V-J Day, it did not take industry long to re-orient itself toward peacetime production. The photography manufacturers went along with the rest. Long-empty spaces on the shelves of camera shops filled up with new supplies, a bewildering variety of camera models, film, paper, chemicals, auxiliary lenses, exposure meters, tripods, gadgets and gimmicks of all kinds.

Popular pastime

Hobby photography moved into the limelight and, along with fishing and baseball, became one of the nation's most popular recreational outlets. Cameras were designed for every price range and pocketbook. Some were made simple enough so that the rankest amateur could not fail to get a recognizable picture, and some were made complicated enough to intrigue the most exacting specialist.

American cameras entered the field as precision instruments, and Americans came to recognize their own country's products as worthy competitors to the imported European models. Japan, too, shook off the effects of war and entered the camera manufacturing field. By the time the Korean conflict took more American soldiers to the Orient, Japan was ready to sell them cameras that looked and performed like the vastly more expensive German models. The Japanese seem to be in the camera field to stay.

Because the hobby photographer was not too keen about carrying around a big camera and a lot of heavy equipment, cameras became smaller and more compact. The 35mm line ceased to be labeled "miniature" and became quite the everyday size. I can see the effects of this change in my own equipment. The heavy old Graflex stayed home more and more; a 35mm Exakta for color and a 2¼ x 2¼ Rollei for black-and-white have taken its place.

More and more automatic features were built into the smaller cameras, features that the older, bulkier cameras never had. To name a few, these include automatic range finders, exposure meters, "electric eye" lens adjusters, and motor driven robot features.

The Century 35NE is the newest member of the Graflex camera family. It has many built-in features, including an exposure meter and dial that automatically set the correct exposure in correction. Its shutter is synchronized at all speeds for both flash bulbs and electronic flash. It illustrates clearly the shift from large cameras to 35mm. size.

Color photography became popular, and its popularity increases every year. "Fast" color film makes possible many once-unobtainable shots, and each kind and brand of film has its own loyal enthusiasts. (Just listen sometime to an argument between Kodachrome, Ektachrome, and Ansco fans). Color has brought in its wake a host of accessories like slide projectors, screens, slide mounting sets, exposure aids, and the like.

Home processing

Color processing has gone through some changes, too. At first the photographer had to mail his films in to one central laboratory for processing. Then, as a result of the operation of anti-trust laws, patents were unveiled and the secrets of processing were made available to many processors. Some films were designed for home color processing. Additional variations came when color prints were available from color negatives, and could be handled more easily than the color slides.

Along with "still" photography, home movies have taken great strides forward as motion picture cameras have become simpler and less expensive. Also, where amateur movie films had been previously almost exclusively black-and-white, the makers have now switched over and become almost exclusively color photographers.

Just a few years ago flash attachments suddenly became standard equipment for even the least expensive cameras. People who had only a nodding acquaintance with the techniques of photography could take flash pictures with ease. The bulbs themselves were reduced in size for greater usability—from ordinary light bulb size, they have shrunk to peanut size without losing light intensity.

Side by side with the smaller flash bulb was developed the "strobe" or electronic flash system, a battery-charged device that uses a permanent head instead of disposable bulbs. "Strobe" is faster and more intense for a shorter period of time, and it has brought high-speed photography within the reach of many amateurs.

Still another post-war photographic development was the Polaroid camera, which completely by-passes the lengthy darkroom processing required to develop and print pictures. With a Polaroid camera the photographer can shoot, count to sixty, and have his completed picture. It is just the thing for impatient people who cannot stand delay. Stereo, or three-dimensional photography, took a new spurt, too, although it also harks back to the old stereoscope in my grandmother's parlor.

These are only some of the high points of photography since World War II. There have been many, many fine advances made in all phases having to do with cameras and photography.

All in all, it has been wonderful to observe this blossoming of the camera industry and the growth of hobby photography. It is also good to feel—as the little boy did when he looked at the ocean—that one sees just the surface and that there is a great deal more of the same underneath.

I did not know, back in April, 1946, when the first camera section of mine appeared in print, whether I could find "ammunition" and subject matter for many more sections. Now, nearly fifteen years later, I feel that the reservoir has only been slightly tapped. In fifteen more years—or even fifty—there will still be more to be learned and enjoyed in photography.

That Christmas list

And now for a couple of final items on the Christmas list, items which show clearly how photography has changed.

In contrast to my old wooden-boxed 4 x 5 Graflex camera, Graflex, Inc., of Rochester, N.Y., has just announced a new metal 35mm camera called the Century 35NE. It has one dial that aligns indicators in the built-in exposure meter and auto-

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matically sets a variety of correct exposures (shutter speed and lens opening combinations) in the shutter. It also has automatic parallax correction, a contrast color range finder, and shutter synchronization at all speeds for flash bulbs and electronic flash. All this, with an f/2 lens, sells for $114.50.

In line with the decrease in camera size is the new foldaway flash gun also being marketed by Graflex, Inc. Called the Graflash M Fan-Fold flash unit, the device is smaller than a package of cigarettes. Small as it is, the device has a three-inch eliptical reflector, a built-in lamp tester, and push button ejector. It uses M5, M2, and M25 bulbs and is powered by an Eveready 505 battery or equivalent. Its price, like its size, is amazing—a small $4.95.

And so our stroll is ended. I wish you all a Merry Christmas, a Happy New Year, and good luck with photography. *Vaya con Dios!*

Three Sisters

(*Continued from page 541*)

glaciers retreat for the last time, about 20,000 years ago, we see a profoundly altered landscape. For moving ice is a master sculptor. The narrow, twisting, V-shaped valleys are now wide, U-shaped troughs; cliff-walled cirques, or glacial bowls, have been excavated among the higher peaks; and shallow basins formed between them, dotted with sparkling, jewel-like lakes. Today there are nineteen small glaciers on the Three Sisters, Broken Top and Bachelor Butte. However, they are probably not remnants of the great Pleistocene glaciation, but rather the result of a "little ice age" during the past 3000 years.

With a final burst of volcanism a few centuries ago, the deep-seated fires of the Cascades died down. But around the Three Sisters they left fifty young cones, wide fields of black lava, and miles of country covered with cinders and pumice. All of these are still so fresh they might have been formed yesterday. And it is doubtful if any other area in the country can equal this as an outdoor museum of both ancient and recent volcanic activity.

So the Three Sisters now rise calmly into the Oregon sky—one a shattered piece of the great Mount Multnomah, the other two within its giant caldera. They dominate an exhilarating land of forests, rushing streams, alpine meadows and lakes, which has become one of the West's foremost summer recreation areas. But magnificent as the country is, it is not a finished product. We can never write THE END to our geological television show, because today is just a moment in the stream of time. Perhaps in the next act the Cascade Range will be worn down to a lowland plain, or possibly the earthly fires will break out anew and forge another great volcano. After all, we have just seen in imagination the passing of sixty million years in half an hour. By that time-scale the human race has existed but half a minute, and the white man's stay in Oregon could be represented by the split-second flash of stroboscopic light.

Is geology dramatic? It is difficult to think of anything much more so!

Water Study

A new governmental group, the Senate Select Committee on National Water Resources, created earlier this year to study national water needs between now and the years 1980 to 2000, has been in the field for public hearings, according to the National Wildlife Federation of Washington, D. C. With Senator Robert S. Kerr of Oklahoma as chairman of the committee, water needs for domestic uses, agriculture, industry, power generation, flood control, recreation, and other uses will be considered by the Senate group, and Federal agencies concerned with water resources have already been asked to prepare reports. Initial fund for the study was $175,000.

New Edition

The National Wildlife Federation, 232 Carroll Street N. W., Washington 12, D. C., has announced that, because of large demand, the supplies of the first printing of its pamphlet, *Our Growing Water Problems*, has been exhausted. Now being issued is a second edition of this work by R. G. Lynch, conservationist-newspaperman of the Milwaukee, Wisconsin, *Journal*, which is extended to include discussions of water problems in the new State of Alaska. *Our Growing Water Problems* treats, on a national scale, the complex problems of managing public water resources for the diverse and conflicting needs of our rapidly expanding population. The new edition is available from the Federation, at the above address, without charge for single copies; quantities up to 25, twenty-five cents per copy, while in greater quantities there is a discount of twenty percent.

Bulletins

"Conservation," a 72-page paper-covered book of natural resources for adults who work in the conservation field with young people, is a publication of the Camp Fire Girls, Inc., 16 East 48th Street, New York City 17. Profusely illustrated, the book presents, many ideas and how-to-do-its for the young conservation worker, guides him in an exploration of the natural resources of his own community, suggests ways for the individual or group to conserve resources, and includes a conservation directory. Priced at $1.50, the volume may be secured from the Supply Division, Camp Fire Girls, Inc., 450 Avenue of the Americas, New York 17, New York.

"Make Your Farm Pond Safe" is pamphlet PA-396 of the U. S. Soil Conservation Service, Washington 25, D. C., available without charge. "Ponds, like any body of water, attract people. When the two come together there is always chance of a drowning," says the introduction to this pamphlet. How farm pond builders and users may avoid such accidents is detailed in print and through illustration. "Water Facts," another leaflet (PA-337) of the Soil Conservation Service, notes that nearly every community in the country has a water problem, and deals briefly with this problem under the headings of Sources, Supply, Needs, Uses, Losses, Floods, and Conservation. The pamphlet is free upon request.

"Oaks (Eastern)" is one of the U. S. Forest Service "American Woods" pamphlets, available for fifteen cents from the Superintendent of Documents, Washington 25, D. C. The oaks are the most important hardwood group in the United States, and this 24-page pamphlet, illustrated with species range maps, will acquaint the reader with the characteristics, range and uses of the many eastern varieties of the oak. "Tree Planters' Notes," No. 35, is another publication of the Forest Service, Washington 25, D. C., for nurserymen and planters of forests and shelterbelts.

Nature IN ROCK AND MINERAL

By PAUL MASON TILDEN

A Lamp for Minerva

TUCKED AWAY IN THE QUIET, mountainous countryside of northern Vermont, only a few miles south of the boundary line between that State and the Province of Quebec, is the little village of Eden Mills, population, according to the latest census, 225. If you have never heard of Eden Mills, it must be that there is little of the romantic connected with the unusual mineral known as asbestos. Gold and silver have had their Dahlonegas, Leads, Tonapahs and Silver Cities, but asbestos has its Eden Mills—unspectacular, small, and solid.

Not far from this little Vermont community, on the flanks of Belvidere Mountain, are the workings of the only asbestos mine of any consequence in the United States—and the United States is the world's greatest consumer of this strategic mineral.

Actually, there are several minerals that are grouped together commercially under the general name of "asbestos;" but since some ninety-five percent of the world's asbestos needs are supplied by the mineral chrysotile, the mineralogist usually has this latter in mind when the word is mentioned.

Soft and strong

Imagine a fibrous mineral that, after proper preparation, is so soft and strong that some six miles of thread can be spun from a single pound of it! It is no ordinary thread, either. The cloth woven from asbestos fiber is unchanged after exposure to temperatures of several thousands of degrees Fahrenheit, and is an excellent insulating material in the bargain, both heat-wise and electrically. Its advantages over more orthodox materials in the manufacture of safety clothing of various sorts—firemen's apparel, for example—are quite obvious.

Although it has been only a hundred years or so since asbestos has been the basis for a vast industry, the mineral chrysotile was well known and highly prized by people of the past. According to the Greek sculptor Callimachus, the golden lamp that burned constantly before the statue of Minerva, in ancient Athens, had a wick "of Carpasian flax, which alone of all other things is inconsummable by fire." It is easy to guess that the sculptor's "Carpasian flax" was chrysotile asbestos; and one of the historians of ancient Rome spoke of the mineral as "equal in value to the finest pearls."

Today, there are an estimated fifty millions of automobiles on the highways of the United States, and additional millions of trucks and buses. Each of these vehicles requires asbestos in the linings of brakes, in clutch facings, and in engine gaskets that must withstand high temperatures. Fireproof shingles and siding, pipe insulation, marine turbine and aircraft jet engine coverings, gaskets—well, a complete list of uses for this mineral would fill several pages of the size of *Nature Magazine's*.

But let us return to Eden Mills, Vermont, and the asbestos "diggings" on Belvidere Mountain, where mining and quarrying go on twenty-four hours a day, and six days a week. Belvidere Mountain is part of a long narrow range of magnesium-rich rock known to geologists as serpentine. Filling the seams and fractures in the serpentine, and derived from it as an alteration product, is the chrysotile asbestos, although the exact process by which the "filling" operation was accomplished has never been wholly determined.

Two varieties

The asbestos itself occurs in two ways. When the fibers of the chrysotile lie at, or about, right angles to the surfaces of the fractured serpentine—as though it had welded the broken parts together—the asbestos

(*Continued on following page*)

Pictured is a specimen of the "cross-fiber" variety of the strategic mineral asbestos, which may be spun into thread and woven into heat-resistant cloth that is used in a variety of applications.

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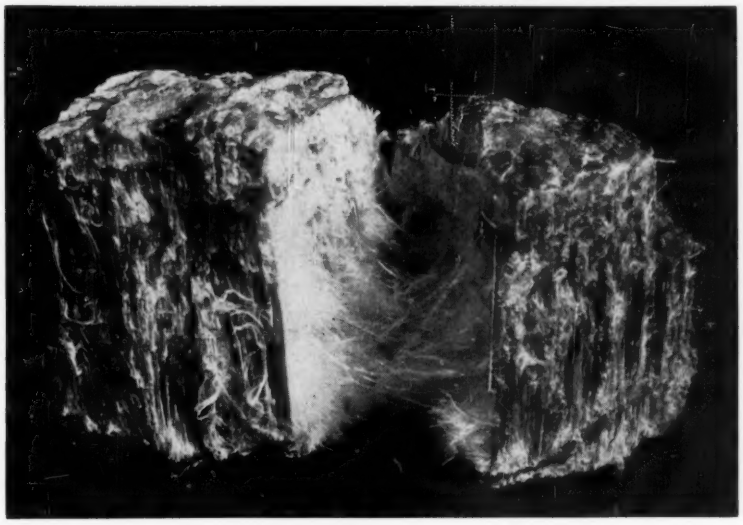

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is known to the trade as "cross-fiber." If the fibers are parallel to the rock surfaces, they are called "slip-fiber." Of the two, the mine owners would far prefer to find the first, because it is the cross-fiber asbestos that is suitable for spinning and weaving; first into yarn, and then into cloth, just like cotton or wool. Cross-fiber chrysotile may fetch as much as $1500 a ton, depending on the length of the fibers; and fiber length, in turn, is controlled by the width of the serpentine rock-fractures. Here it is that a fraction of an inch is important, for there may be as much as $400 a ton difference in the price brought by three-quarter-inch long fibers as against those measuring three-eighths of an inch!

The asbestos fibers that lie parallel to the broken rock surfaces are shorter than the cross-fiber, and are known to the industry, appropriately enough, as "shorts." Shorts go into the production of asbestos-board, insulating paper, asbestos cements of various kinds, shingles—in fact, a veritable host of items. In milling the crude chrysotile, it is important, price-wise, to separate the fibers with a minimum of breakage, so considerable hand-work is needed to free the asbestos from its serpentine rock matrix.

In recent years, the using industries in the United States have been consuming this mineral at a rate of more than three-quarters of a million tons annually. Of course, this consumption is far beyond the supply capacity of Belvidere Mountain and the few smaller asbestos mines scattered about the country. Much chrysotile is imported from neighboring Canada and from overseas, and American research men are always busy trying to find substitutes for the strategic mineral—so far, it might be added, without notable success. The Carpasian flax of Callimachus is still supreme in its field, and seems likely to be for some time to come!

ITEM

For a hundred and fifty years people have been picking rough diamonds from the glacial drift of our northern tier of States—some nice diamonds, too. It is a tantalizing business. Where did the stones come from? The only answer, so far, is: "Somewhere to the north."

However, the United States does possess one real diamond field, the so-called "diamond crater" near Murfreesboro, Arkansas, which is a roughly circular intrusion of the ultra-basic rock called "kimberlite," like the rock of the famous diamond-pipes of South Africa. Some fine diamonds have come from the Murfreesboro locality, including the "Star of Arkansas," valued at $25,000, and found in 1956. The most recent discovery there was made during the past summer, when Mrs. Callie L. Jemison, of Mamou, Louisiana, unearthed a 3.65-carat stone.

BOOK REVIEW

Our Mineral Resources

By Charles M. Riley. New York. 1959. John Wiley and Sons, Inc. 338 pages, illustrated in black and white. $6.95.

This is a discussion of American mineral resources—including that most important mineral, water—and how they came to be where they are found. Stripped of as much technical verbiage as is possible under the circumstances, *Our Mineral Resources* is a valuable supplement to volumes like Bateman's *Economic Mineral Deposits*, which go into the whys and wherefores of Nature's mineral concentrations by chapter and verse, geologically speaking.

Magpie

(Continued from page 520)

The females, away from the nest, congregate together with harsh, cluttering sounds; at some distance, but within sight, the males get together for man-talk. Both sexes are thought to be vain because of their remarkable beauty and constant preening, but we rather think they are scratching for relief from mites and lice.

Western ranchers do not like magpies any more than Eastern farmers like crows, although both birds do more good in insect destruction than they do harm in other respects. Some ranchers say magpies have been seen feeding from the festering wounds of living cattle, but this may be a rationalization that enables them to shoot the birds whenever possible. If the story is true, in any of its several variations, we think it is the exception rather than the rule. We opened the stomachs of the birds that we saw die, and found only remains of insects.

In this rookery, the magpies had an apparent social organization. One old male bird seemed to be the group leader. After many hours of watching, we would hazard the guess that younger birds (both male and female) always looked to this old bird for a cue. If he yawned sleepily, the whole rookery took on a subdued atmosphere, and birds dozed or sat more or less quietly everywhere. If the old fellow was garrulous, the place resounded with raucous noise; if he wanted to play, he dove after a neighbor's tail, and there was immediately much friendly tail pulling, accompanied by mortal screams of real or simulated agony.

The magpie's distribution seems to be all of the United States west of the Mississippi, northward to lower and middle-coast Alaska, and southward to the Rio Grande Valley. The habitat is usually prairie hills, but the bird is often seen in cottonwood clumps and thinly forested evergreen timberlands.

This bird is not only one of the handsomest in our bird-watching experience, but also one of the most intelligent. It is our firm conviction, based on the experiences we have described here, that a flock of angry magpies—a big flock, of course—could kill a man. And if they did, we think they could eat him, too!

Bulletins

"The Hemlock Borer," technical bulletin 19 of the Wisconsin Conservation Department, discusses the life history and biology of *Melanophila fulvoguttata*, the hemlock borer; the damage it has done among stands of hemlock in Wisconsin, and procedures that may reduce such damage. There is also a section dealing with the European pine shoot moth, an insect that stunts and distorts the red, or Norway, pine and other hard pine species, and which has caused serious damage to hard pines in parts of Wisconsin. Available from the Wisconsin Conservation Department, Madison 1, Wisconsin, without charge.

"From the Dust of the Earth," information bulletin 78 of the U. S. Soil Conservation Service, is a 16-page pamphlet that stresses the dependence of the daily lives of all Americans on the produce of the soil, and the necessity of caring for the soil. It contains a number of suggestions as to what individuals can do to assist in the soil conservation movement. Available from the Superintendent of Documents, Washington 25, D. C., for 10 cents.

Reviews

Planetaria and Their Use For Education.

A Symposium of Papers. Bloomfield Hills, Michigan. 1959. Cranbrook Institute of Science. Edited by Miriam Jagger. 205 pages. Illustrated. $3.50.

One hundred and one individuals gathered at the Cranbrook Institute of Science in September, 1958, for the Symposium on the Educational Use of Planetaria. They represented 67 institutions, included the large planetaria. James A. Fowler, Cranbrook's Curator of Education, was in charge. From the four-day session came the material contained in this paper-bound publication. It should be immensely useful to anyone concerned with smaller planetaria of any kind.

Those Desert Hills and Other Poems

By Mildred Breedlove. Los Angeles, Cal. 1959. Vogue House. 95 pages. $2.95.

One can well understand why the author was chosen as Poet Laureate of Nevada after reading the clear and concise, yet sensitively written poems in this volume. She fully understands, and the reader will, too, how desert country with its harsh beauty gradually becomes not only desirable, but irresistable, even to one whose roots are deep in a part of the country that is lush and green. R.B.

My Side of the Mountain

By Jean George. New York. 1959. E. P. Dutton and Co. 178 pages. Illustrated by the author. $3.00.

This is a story that any boy—or many girls, for that matter—will love. Sam Gribley, its central character, does what many a boy would like to do—live in the wild and become self-sufficient in such an adventure. And he did so with the modest equipment of a penknife, ax, ball of cord, and some flint, steel and tinder. This should be sufficient indication of what Sam faced. Young readers will enjoy proxy companionship with him through this interesting and informing story.

Briefly Noted

Peep-lo. By Jane Castle. New York. 1959. Holiday House. Illustrated. $2.50. A book for the youngster beginning to read and with a curiosity about Nature.

Grass Productivity. By André Voisin. New York. 1959. Philosophical Library. 352 pages. $15.00. A work for the agronomist.

Pets at the White House. By Carl Carmer. New York. 1959. E. P. Dutton and Co. 96 pages. Illustrated by Sam Savitt. $2.95. Story for the 10-to 13-year-old reader about the various pets that have lived in the White House.

Prehistoric Zoo. By Carroll Lane Fenton and Mildred Adams Fenton. New York. 1959. Doubleday and Company. Illustrated by Carroll Lane Fenton. $2.50. Introducing prehistoric birds, mammals and reptiles to the younger reader; with fascinating text and effective illustration.

Headspins of a Pedagog. By Jacob C. Solovay. 303 Beverly Road. Brooklyn 18, N. Y. 1959. 80 pages. Paperback. $2.50. Original light verse, wry and humorous, on sundry topics.

Wild Voice of the North. By Sally Carrighar. New York. 1959. Doubleday and Company. 191 pages. Illustrated. $3.95. The story of Bobo, part wolf and part dog, who was the boss dog of Nome, Alaska.

Standard Handbook for Telescope Making. By N. E. Howard. New York. 1959. Thomas Y. Crowell Co. 326 pages. Illustrated. $5.95. Practical, accurate yet easy-to-use guide to the art of telescope making.

Animal Fun Book. By Francis A. Frey and Frances W. Keene. Pelham, N.Y. 1959. The Seashore Press. 112 pages. $1.00. Coloring pages, cutouts, stories, puzzles, and games for the youngster 8 to 14.

Our 50 States at a Glance. By Monroe Heath. Redwood City, Cal. 1959. Pacific Coast Publishers. 62 pages. Illustrated. $1.00. Pictures and concise information about our States.

Wildlife Conservation.. By Ira N. Gabrielson. New York. 1959. Macmillan Company. 244 pages. Illustrated. $5.50. Second edition of this excellent book on conservation and its issues.

Bobwhite from Egg to Chick to Egg. By Elizabeth and Charles Schwartz. New York. 1959. Holiday House. 48 pages. Illustrated by Charles Schwartz. $2.50. The title describes this excellent book for young people.

The Survival Book. By Paul H. Nesbitt, Alonzo W. Pond, William H. Allen. New York. 1959. D. Van Nostrand Co. 352 pages. Illustrated. $7.50.

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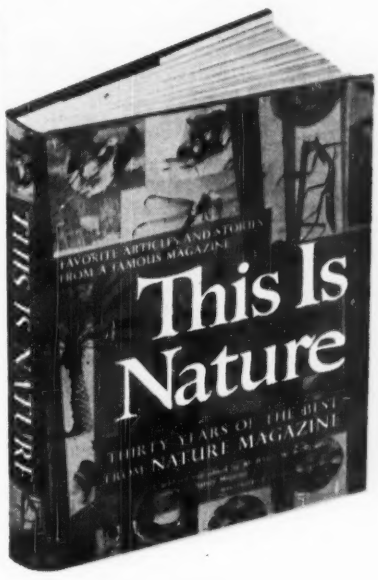

This Is Nature

Selected and edited by

RICHARD W. WESTWOOD

editor of *Nature Magazine*

In fascinating articles and heart-warming stories, in remarkable photographic sequences, and in 10 beautiful and scientifically accurate full-page drawings by Walter Ferguson, nature's wonders and beauties unfold.

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Reviews

Boy's Book of Turtles and Lizards

By Percy A. Morris. New York. 1959. The Ronald Press Company. 229 pages. Illustrated. $4.50.

While this is given a rather restricted audience by its title, actually it is an introductory book for any boy or girl—of whatever age—to the turtles and lizards. The text is readable at the same time that it is comprehensive. It is useful to anyone who wishes to maintain a terrarium or who just wants to know and identify specimens in the field.

The World of Insects

By Paul Pesson. Translated by R. B. Freeman. New York. 1959. McGraw-Hill Book Company. 204 pages. Illustrated in color and black and white. $15.

The world of insects is the most numerous and most diversified in the animal kingdom. It still holds many secrets, some of the fascinations of which this volume dramatically suggests. With 225 photographs, fifty-two of them in full and beautifully reproduced color, and some 35,000 words of text, the author, a French entomologist, introduces the reader to some of the strange and beautiful creatures of the insect world. It will whet the appetite for more insect knowledge.

A Field Guide to Bird Songs

Recorded by the Laboratory of Ornithology, Cornell University, under the direction of Dr. Peter Paul Kellogg and Dr. Arthur A. Allen, in collaboration with Roger Tory Peterson. An album of two records presenting the songs and calls of more than 300 species of land and water birds of Eastern and Central North America. $10.00.

Certainly Peterson's *Field Guide to the Birds* needs no introduction to most of our readers. But now something new has been added. His guide has, in effect, been enabled to break into song. Closely coordinated with the field guide, two large-size, two-sided records (33-1/3 RPM) present the songs or calls of a large percentage of the birds found east of the Rockies. Given a cover dress closely similar to that of the dust cover of the guide, the two publications (if we may call the album that) complement one another. The bird watcher and student are now able to take the field guide in hand, lend an attentive ear to the recorded songs while studying the book, and thus prepare for field experience. And if there be doubt which song is which, when heard in the field, there is always the album to return to. We know of no other similar coordination of book and music, certainly not in the Nature field.

Salmon of the Pacific Northwest

By Anthony Netboy. Foreword by Senator Richard L. Neuberger. Portland, Oregon. 1959. Binfords and Mort. 122 pages. Illustrated. $3.00.

One of the great dramas of Nature has been the migration of salmon from the sea and up the rivers of the Pacific Northwest to spawn. These fishes have long been a great natural resource, one that man abused even before he complicated the existence of the fishes by the erection of high dams and other barriers to accomplishment of the aims with which Nature had endowed the salmon. Anthony Netboy has studied and written extensively about this resource and knows well the controversy that has surrounded it. In this book he has informingly gathered the story of the salmon, yesterday and today.

The Salt-Water Aquarium in the Home

By Robert P. L. Straughan. New York. 1959. A. S. Barnes and Company. 262 pages. Illustrated. $7.50.

According to the publishers, who should know, the author of this interesting and useful book is one of the few full-time marine collectors and aquarists in the world. He has spent thousands of hours under the surface of the sea and knows whereof he writes from intimate association with and observation of marine life. This book should be of value not only to the individual maintaining a modest salt-water aquarium but also to the professional aquarist.

Natural History of the West Indies

By Gonzalo Fernandez de Oviedo. Translated and edited by Sterling A. Stoudemire. Chapel Hill, N. C. 1959. University of North Carolina Press. 140 pages. Paper-bound, $2.50.

Late in 1523 de Oviedo returned to Spain from the New World on the fourth of twelve crossings of the Atlantic he made in a distinguished but turbulent career. By that time he had completed part of his *General and Natural History of the Indies*, in which Emperor Charles V apparently expressed some interest, although the manuscript had been left in Santo Domingo. So the ex-explorer was granted leave to write a new natural history, which was published in Toledo in 1526. This makes fascinating reading as translated and edited by Mr. Stoudemire. It is published as Number 32 of the "Studies in the Romance Languages and Literatures" of the University of North Carolina.

Briefly Noted

The Boy Who Drew Birds. By Polly Cameron. New York. 1959. Coward-McCann. Illustrated by the author. $2.50. A little boy liked to draw and in every picture he drew a bird or two. A charming little book for ages 4 to 7.

Worlds Beyond the Poles. By F. Amadeo Giannini. New York. 1959. Vantage Press. 218 pages. $3.50. A new concept of cosmology.

Fundamentals of Physical Science. By Konrad Bates Krauskopf. New York. 1959. McGraw-Hill Book Company. 653 pages. Illustrated. $6.95. The fourth edition of this excellent textbook by a Professor of Geochemistry at Stanford University.

Principles of Biochemistry. By Abraham White, Philip Handler, Emil L. Smith and DeWitt Steetin, Jr. New York. 1959. McGraw-Hill Book Company. 1149 pages. Second edition of this textbook.

Aquarium Book for Boys and Girls. By Alfred Morgan. New York. 1959. Charles Scribner's Sons. 209 pages. Illustrated. $3.00. Practical guide for the young aquarist. This is a revised edition.

Grasslands. By Delia Goetz. New York. 1959. William Morrow and Co. 64 pages. Illustrated by Louis Darling. $2.75. The grasslands are found in many countries and are important in their economy.

Mountain of Fire. By Jack Steffan. New York. 1959. The John Day Company. 191 pages. $3.50. One in a series of novels for readers 12 years and up, each novel laid in a National Park. This one has Lassen Volcanic National Park as its background.

Alligator Crossing. By Marjory Stoneman Douglas. New York. 1959. The John Day Company. 192 pages. $3.50. Another in the series of National Park novels for younger readers, in this case with the background of Everglades National Park.

Briefly Noted

Our Friend the Forest. By Patricia Lauber. New York. 1959. Doubleday and Company. 61 pages. Illustrated by Anne Marie Jauss. $2.00. Introducing the younger reader to the story of forest conservation.

The Garden Flowers of China. By H. L. Li. New York. 1959. The Ronald Press Co. 240 pages. Illustrated. $6.50. Legend, lore and scientific information about plants of China by an eminent Chinese botanist and taxonomist.

Properties of Matter. By F. C. Champion and N. Davy. New York. 1959. Philosophical Library. 334 pages. $10.00. Third edition of this scientific work.

Country Matters. By Barbara Webster, Philadelphia. 1959. J. B. Lippincott Company. 307 pages. Illustrated by Edward Shenton. $5.00. A harvest of nature writing, both exotic and familiar, gleaned from the works of novelists, naturalists and country gardeners.

Three against the Wilderness. By Eric Collier. New York. 1959. E. P. Dutton and Company. 349 pages. Illustrated. $4.95. Second printing of an amazing true story of a modern pioneer family and the miracle they wrought in the barren northern wilderness.

Exotic Aquarium Fishes. By William T. Innes. Philadelphia. 1959. Innes Publishing Company. 542 pages. Illustrated in color and black and white. $9.75. This is the nineteenth edition of this standard reference work on this subject. Without it no specialist in exotic aquarium fishes is properly equipped.

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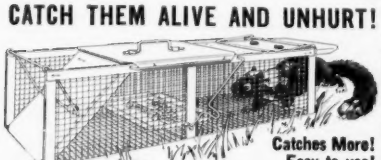

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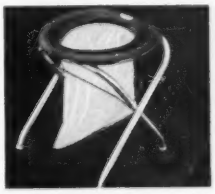

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Nature AND THE MICROSCOPE

By JULIAN D. CORRINGTON

Curator of Calcium

REGULATION OF THE LEVEL OF calcium in the blood is a most important task for the well-being of man and his relatives among the higher vertebrates, and that is the concern of the parathyroid glands. These are the mighty mites of the endocrine system, tiny but powerful, first described and named by the Swedish scientist, Ivar Sandstrom, in 1879.

Ordinarily the parathyroids are four in number—two pairs—but one or two may be lacking, and as many as twelve have been recorded. They develop from thickenings of the third and fourth pouches of the pharynx in the early embryo, those outpocketings of the entoderm that push toward the skin and make up most of the linings of the gill slits that we inherit from our remote fish-like ancestors. The small mass of epithelial cells that breaks off from the third pouch on each side constitutes parathyroid III, that from the fourth pouch parathyroid IV; III migrates farther than IV and becomes the posterior of the two on each side, while IV is the anterior. Both of these pairs of bodies come to lie against, or even embedded in, the lateral lobes of the thyroid gland, on the sides of the neck. Occasionally one or more parathyroids III, which arise in very close association with the thymus, may accompany that gland as it migrates downward into the chest. Thus the number and distribution of the parathyroids is subject to considerable variation.

In the adult each parathyroid gland is a small body, oval or pear-shaped, averaging some 6 by 4 by 2 mm, and yellow to red to brown in color. It has its own connective tissue capsule, which may be continuous with or even embedded within the similar capsule of the thyroid. Small wonder they were overlooked for so many centuries by anatomists. From the capsule, some inconspicuous trabeculae (partitions) of fibrous tissue extend into and subdivide the gland, carrying blood vessels, lymphatics, and nerves. Among the parathyroid cells themselves is a framework of reticular tissue for support of the abundant mesh of sinusoidal capillaries.

Glands in contrast

The usual slide preparation is a section through both thyroid and parathyroid, in which the two glands contrast strikingly. The thyroid is made up of a great many large follicles containing a pink-staining secretion termed colloid, and appears light in coloration and with more open space than cells; the parathyroid is very dense and compact and stains darkly. The differences are readily apparent when the slide is looked at without magnification.

Under high power the parathyroid exhibits two main kinds of cells. Those which are most numerous are called thereby the *principal cells* or *chief cells;* the other type is the *oxyphil* or *acidophil cell*. Of the two the principal cell is the smaller, but its nucleus is the larger. The principal cell nucleus is vesicular and the cytoplasm non-granular; the oxyphil cell nucleus is denser and more darkly staining and the cytoplasm is heavily granular. The oxyphil cells do not make their appearance until late in childhood and their function is unknown. Histologists have concluded that it is the principal cells that secrete the one known hormone manufactured by this gland.

This hormone or internal secretion, *parathormone*, is the regulator of calcium metabolism. If most or all of the parathyroids are removed surgically, as sometimes happened unwittingly before they were identified, or as may be done on experimental animals, or if they atrophy through disease, the condition *hypoparathyroidism* (underfunctioning) ensues and the chief symptom is *tetany*, manifested by a fall in the level of the blood calcium and the onset of muscular spasms. It may be relieved by the administration of calcium or an extract of the parathyroids, but unless such treatments are undertaken, death will result.

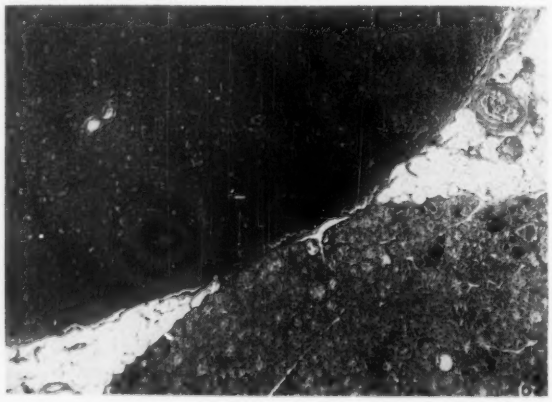
Overactive glands

In *hyperparathyroidism* (overfunctioning) the glands are overactive and produce too much of their hormone, due to overgrowth of the glands or to tumors. There is then too much calcium in the blood and

An entire parathyroid gland, sectioned 73X.

PHOTOMICROGRAPHS FROM SLIDES LOANED BY WARD'S NATURAL SCIENCE ESTABLISHMENT, INC.

Thyroid (light) and parathyroid (dark), 115X.



this leads to a withdrawal of calcium and phosphorus from the bones and a deposition of calcium in the kidneys and other soft tissues. This condition may be produced in experimental animals by giving overdoses of the hormone.

When the glands are normal and working properly, they produce an amount of parathormone that maintains a constant level of calcium in the blood, and this "kicks back" to regulate the quantity of hormone secreted so that the system stays in balance. In turn, the parathyroids are thought to be controlled by a parathyrotrophic hormone from the anterior lobe of the pituitary, the master gland of the body.

Biocentennials

One hundred years ago, an unusual number of noteworthy circumstances occurred in science. We have all read a great deal during the centennial year, 1959, about the publication of the *Origin of Species* by Charles Darwin, a book that was destined to remake the scientific and philosophical worlds. This portentious event overshadowed all else, but there were a number of others that helped make 1859 a most extraordinary year

This was the birth year of Svante August Arrhenius, at Schloss Wijk, near Upsala, in Sweden, who became a famous physicist and chemist. He studied at Upsala and Stockholm, becoming lecturer in physics at Stockholm in 1891, and a full professor in 1895. Noted for many contributions, his name will live forever as the author of a paper on electrolytic dissociation, given before the Stockholm Academy of Sciences in 1883, a cornerstone work in modern physical chemistry. High school and college students today, early in their introductory chemistry course, learn that sodium chloride (for example), when going into solution in water, dissociates into its two elements, but also that the atoms are ionized, the sodium atoms being positively charged electrically, the chlorine atoms negatively charged.

Lecture series

Arrhenius delivered a series of lectures on toxins and antitoxins at the University of California in 1904. In biology—showing how a scientist can run into trouble when he steps out of his proper field—he held the curious belief that life on any of the habitable worlds is continually emitting spores that can traverse space and settle upon other planets where conditions are right, there to germinate into a new series of living forms.

The year 1859 was also the birth date of Pierre Curie, in Paris. Educated at the Sorbonne, he later became professor of physics at his alma mater. He published on a variety of subjects, but became famous for his work on radium, with his wife, Marie Sklodowska, born in Warsaw in 1867. After Henri Becquerel discovered the radioactive properties of uranium, in 1895, it was observed that such uranium minerals as pitchblende were more radioactive than uranium itself, and this was judged to indicate that there was something else in the mineral that was more radioactive than uranium. The Curies embarked on a long and arduous task of fractionating tons of pitchblende, with the result that in 1898 they announced the discovery of polonium and radium, and worked out their properties in the years that followed. They were awarded the Davy Medal in 1903 and, with Becquerel, the Nobel Prize in the same year. A great misfortune befell the interests of science when, in 1906, Pierre Curie was run down and killed by a dray on a Paris street.

Man of science

At the other end of the life span, 1859 marked the death of the most fabulous person of his times in Europe, Baron (Friedrich Heinrich) Alexander von Humboldt, born in Berlin in 1769. This was a man of tremendous endowment and attainments, a world traveler and explorer, the founder of the sciences of physical geography, meteorology, and biogeography. We once spent a summer, some years ago, collecting along the Humboldt River and in the Humboldt Mountains of Nevada, a mere instance of the worldwide perpetuation of his name as a discoverer. He explored the far reaches of the Amazon and the Orinoco, and countless other remote and unknown situations in the eighteenth century.

A man of wealth and influence, he was feted wherever he went. Preferring Paris, he was ordered to attend German courts, and at one time was a member of the illustrious group at Weimar, with Goethe and Schiller. Humboldt's chief work was his *Kosmos*, in five volumes, laboring far into his old age. Here and in other publications he laid down the basic principles of the geographic distribution of animals and plants. The most famous geographic feature that bears his name today is the Humboldt Current, one of the major oceanic rivers, that flows north off the coasts of Chili and Peru.

Birth of spectroscope

The year 1859 is generally credited as that of the birth of the *spectroscope*, an instrument considered as even more important in astronomy than the telescope. The man who first worked out the complete system of spectroscopic analysis, by means of which the chemical composition of the heavenly bodies is known, was Gustav Robert Kirchhoff (1824-1887), German physicist. Born at Königsberg, he took his doctorate there, and then became professor of physics successively at Breslau, Heidelberg, and Berlin. He was the author of many papers on electricity and radiation.

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Family Album

12. Fingerprint Readers

Our illustration shows one form of a special simple microscope that is adapted for the purpose of studying human fingerprints, as made on cards for the system of personal identification. In the card catalog files of fingerprints, as those of the Federal Bureau of Investigation, not all records are those of criminals, since this system is used for many military and civilian purposes unconnected with crime. But the most publicized usage is that of identifying prints related to a crime.

This instrument has a wide-field lens of high quality mounted in a frame with a horseshoe base. Focusing is done by means of screw threads

on the lens holder. The base is slotted to receive any of several forms of glasses, placed directly upon the print, called *dispositives*. These are ruled according to various systems of marking off areas in the print for purposes of ridge counting, one of the items used in classifying prints.

Staff Changes at B & L

After a long and distinguished career, Carl L. Bausch has retired as Chairman of the Board of the Bausch & Lomb Optical Company, in Rochester, New York. He is succeeded by Carl S. Hallauer who has retired as President. Mr. Hallauer has been identified with the Company for more than forty years, having first appeared on the payroll in 1919. He is an officer or director of all of the firm's domestic and foreign subsidiaries, and became President of Bausch & Lomb in 1954. His tenure as top man has been marked by increasing growth and expansion and his genial personality will long be remembered by those with whom he came in contact.

The new President and chief executive officer of this great American industrial and scientific company is William W. McQuilkin, a native Californian, graduate of Princeton, and a former Rhodes Scholar. After a career as a lawyer, Mr. McQuilkin joined Bausch & Lomb in 1938, and rose rapidly through a succession of offices with the main company as well as its subsidiary organizations. He is also active in many civic institutions.

Valedictory

ALL THINGS must come to an end at some time, and so we have arrived at that moment when we must write the last item for this Department of a fine old journal. It is a sad occasion for us, yet one compensated by the wealth of associations we have made in the more than twenty-two years we have spent in writing about the microscope and the almost limitless field of subjects for which it is the king of instruments. We note that there have been more than twelve hundred separate items during this time, which seems incredible in retrospect.

Many people have taken the trouble to write us for information or in appreciation. Our relationship to the magazine staff and in particular to Editor-in-Chief, Richard W. Westwood, has been one of continuous friendship and cooperation. No partnership could have been happier.

Should any reader be interested in a bibliographic listing of the feature articles, for reference purposes, we shall be glad to mail a mimeographed list on request.

We have enjoyed digging out and composing the many features and subfeatures, and hope we shall again meet the great majority of our readers when we resume in the columns of *Natural History*. So we shall not say good-bye, but just *au revoir*.

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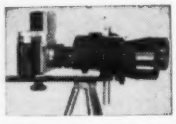

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TIME LOCK

Behind this gate there used to be
A woodland and a grass-grown hill
That held a castle few could see;
It held the elves who live there still.

We spent a million on this space,
Exchanging trees for chrome and glass,
Erasing hills and every trace
Of tiny footprints in the grass.

And yet, we could not fully take
Possession of the grounds. Our tears
And tractors were too weak to break
Their spells that last a thousand years.

And while it's empty now, at night
The castle rises. . .shining bright.

—A. Kulik

NOVEMBER VIGNETTE

(*New York City*)

Asudden out of the morning's lonely mist
A chicadee spoke to me on Cherry Street . . . .
Then went he undulating wingly fleet.

My autumn heart went undulating lest
Compassionless I ever fail to greet
The wayfarer—my heart now meadow-sweet.

John F. Davidson

DISAPPEARING MOUNTAIN

Now when the darkness coolly sent
Its black erasers over light,
Our mountain packed its bag and went
On tip-toe deep into the night.

Daniel Smythe

MATILIJA POPPIES

Sheaves of ghostly blossoms,
Starlit, pale
Matilija poppies
Line the desert trail,
Lifting out of dust
Wind-parched, bone-dry,
Their luminous discs
To the chill night sky
Where the moon looking down
Can see her misty self
In myriad petaled mirrors
On the mesa shelf.

Ethel Jacobson

DRAWN SHADES

Cottage, in the snow,
Does your occupant know
That in the quiet night
The world was made all white?
No footprints show—
No voiced winds blow!

Margaret Speer Edwards

RAINBOW RAIMENT

Blue of hooded lupine,
Mauve of sand verbena,
Lacy white of yarrow
And starry covena,
Yellow gold of poppy
And palo verde tree,
Red of mariposa,
Pink of filaree,
Tawny flame of paintbrush
Like a robin's throat—
Jauntily the desert
Wears its Jacob's coat.

Ethel Jacobson

I WAS FIVE

I was five, that day I saw the moth
And crawled beneath the pasture gates to follow
Its yellow flight. The path was long and wet,
And where it dipped into a shaded hollow
I found a tiny town, and knew the truth!
Who else would use silk webbing for a roof?
Silk affixed with seed pearls, emerald floors,
I touched the sparkling coolness, peered through doors,
But found no one at home, so fell asleep
There where the morning mists were soft and deep.
The sun aroused me and I woke to sorrow.
My gossamer town was gone and in its place
Nothing but old spider webs on alders,
Graying in the sun like antique lace

Catherine Cameron Thaxter

PRECEPT

How blest is one who giveth heed
To sparrow swinging on a reed.

—Eddie W. Wilson

ON MEETING A FOUR-FOOTED STRANGER

O woodland elegance! Here
A personage paused,
Exquisite of limb,
Spare,
Incredibly slim—
While the lancet mind probed, appraised.
And suddenly I flared
At what some dullard dared
Name you.
Weasel, if I were you,
I'd sue!

Ethel Jacobson

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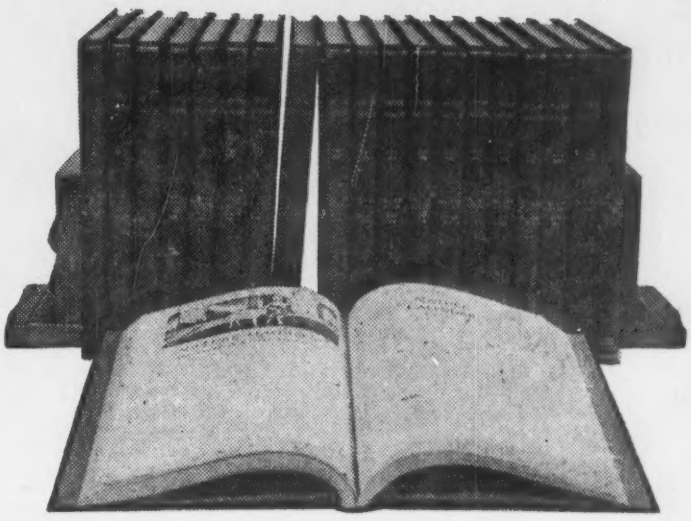

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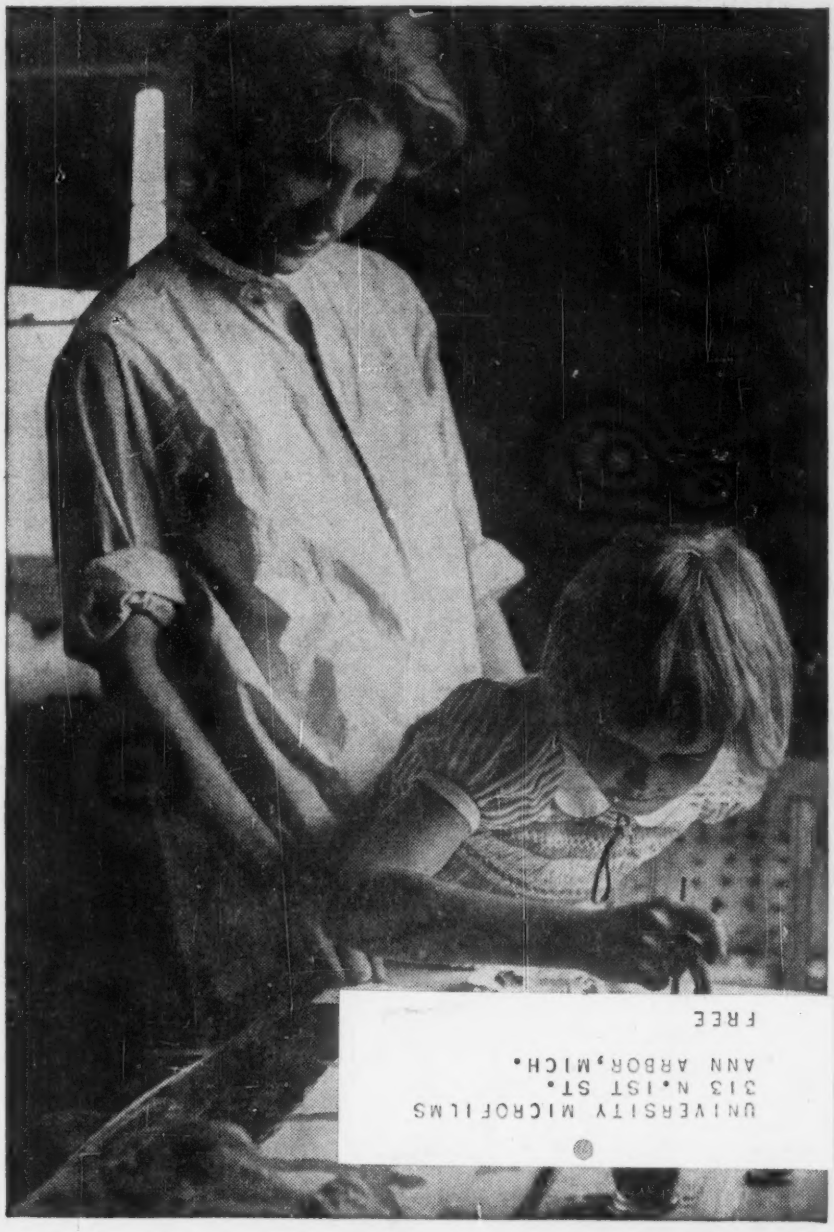

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